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Vol. XII FEBRUARY, 1922 No. 2

THE WORK OF THE LEAGUE OF RED CROSS SOCIETIES' TYPHUS RESEARCH COMMISSION TO POLAND

FRANCIS W. PALFREY, M. D.
Boston, Massachusetts

Read before the Public Health Administration Section of the American Public Health Association at the Fiftieth Annual Meeting, New York City, November 15, 1921

TYPHUS fever has many analogies with Rocky Mountain spotted fever. Both are transmitted by body parasites; typhus fever by the body or clothing louse, and Rocky Mountain spotted fever by the tick, Dermacentor venustus. There are similarities also in their pathology and clinical features. Dr. Wolbach, in the course of the work in which he demonstrated the organism named by him Dermaeenrokenus rickettsi* in Rocky Mountain spotted fever, became impressed with the analogies between Rocky Mountain spotted fever and typhus fever, and in 1919 went to Mexico to study typhus. In typhus autopsy material obtained there he found previously undescribed organisms which strengthened his determination to continue his studies of typhus fever by methods similar to those followed in his investigation of Rocky Mountain spotted fever. Later in the same year he was invited by the League of Red Cross Societies to organize a commission to conduct such an investigation in Poland.

Accordingly, in January, 1920, Dr. Wolbach, Dr. Todd and I, with three assistants, sailed for Europe. In Paris we were joined by Mr. Bacot, the entomologist of the Lister Institute in London. From Paris we proceeded through Cologne and Berlin to Warsaw and then to Vilna. East of Berlin we experienced the unbelievably crowded state of all railway trains, which is undoubtedly an important factor in the transmission of typhus-bearing lice. In Vilna we found that the hospital in which it was planned that we should work was seriously delayed in its opening, chiefly on account of damage done to it by the Germans, who had torn out all plumbing for the metal and had done other damage in pure vandalism.

We therefore returned to Warsaw and there we were fortunate enough to make satisfactory arrangements by which we could begin work with less delay. This we owe to the cordial coöperation of the Polish authorities, especially Dr. Rajchman of the Ministry of Public Health, and to the very great services of the American Red Cross under Col. Chesley, through whose organization we obtained nurses, supplies and transportation.

Dr. Rajchman gave the commission laboratory space in the new public-health building. This building was still under

*Wolbach, S. B. *Jour Med. Research*, Boston, 1919, xli, 1.

construction, but the parts of it assigned for our use, by special work, were quickly made habitable. It was also arranged that we should assume complete control of one division of the St. Stanislaus Hospital, the chief contagious disease hospital of the city of Warsaw, then devoted entirely to typhus fever, with a normal capacity of three hundred beds. It was unfortunate that the laboratory and the hospital were both situated on the outskirts of the city and in different directions. They were separated by considerable distances from each other, from our quarters in the center of the town and from the nurses' quarters of the American Red Cross. But by the use of one and later two Ford cars and occasional ambulances we were able to get along for the period of our work.

At the hospital the arrangement was that we should be privileged to transfer to our division cases selected from other wards of the hospital and transfer them back to the Polish wards as soon as they became convalescent. It was also arranged that we should have full autopsy privileges in all fatal cases. Our decision to assume control of a division instead of observing cases in the Polish wards was reached partly for the safety of ourselves and of our nurses, since in no Polish hospital that we visited were the patients satisfactorily deloused. In fact one staff physician, two nursing sisters and a priest of the St. Stanislaus Hospital had typhus while we were there. The absence of cases in our personnel was undoubtedly due to the fact that we conducted our division as a separate hospital within a hospital and deloused every patient transferred to it.

But the arrangement had other great advantages. By having a selected number of the sickest and most typical cases concentrated under our care we had an unusual opportunity to study the clinical course of the disease. Dr. Wolbach and I have given the results of our observations in our articles on typhus fever in the *Oxford Medicine* and in the *Medical Clinics of North America* for May, 1921. While clinical study was not one of the first objects of our commission, nor is clinical description a purpose of this meeting, it may add to the clearness of what I have to say later if I give here a brief summary of our general knowledge of typhus fever as a disease.

Typhus fever has occurred throughout history in epidemics following wars and disasters. It was until nearly a century ago confused with typhoid fever, although the two diseases are of totally different pathology and have only slight superficial clinical resemblances. In 1909-10 Nicolle first proved its transmission by the body louse; this has been amply confirmed. At present it seems improbable that there is any other important means of transmission. The single bite of an infected louse will cause the disease in man; if one case appears in a louse-infested and crowded community it is likely to create an epidemic.

The incubation period from the bite of the louse to the appearance of symptoms is stated to be from eight to fourteen days. The onset of symptoms is abrupt and usually violent, with chill, feverishness and severe headache. Between the third and the seventh day the rash, an eruption of red spots scattered with more or less profusion all over the body with exception of the face, appears. After the appearance of the rash the patient continues to have high fever and is usually delirious. Patients who recover show a rather rapid improvement, with falling temperature usually between the twelfth and fourteenth days, and become convalescent. Most cases have bronchitis, and bronchopneumonia is responsible for a large proportion of the deaths. The other chief type of fatal outcome is characterized by the gradual passage into a state of stupor in spite of the disappearance of fever. Dr. Wolbach's autopsy findings tended to show that this stupor may be connected with

lesions of typhus fever in the small blood vessels of the brain.

The mortality of typhus fever varies in different epidemics from 50 per cent down to 5 per cent. The mortality increases according to the age of patients, from slight below the age of twenty, to very high above the age of forty. One attack gives permanent immunity. No method of specific immunization or specific treatment has been established.

In the administration of our division we had practical experience in carrying out preventive measures. The method which we followed I have described in the *Modern Hospital* for April, 1921. To overcome the danger of infection of personnel which has been so great in most typhus hospitals, the chief necessity is thorough delousing of all patients before admission to wards and corridors where non-immune personnel work. And the difficulty of this lies not in lack of proper methods; practically the whole difficulty lies in the danger that the process of delousing may be carelessly or perfunctorily performed. All hospitals that we visited had adequate systems of delousing outlined in rules, but the carrying out of these was left to irresponsible orderlies under little or no supervision. The process so applied, in my opinion, did more harm than good, since it tended to create a sense of security where no security existed. The delousing process should be under almost constant supervision by a responsible officer. If the admission delousing is complete and the presence of lice from other sources is prevented, particularly by exclusion of friends of patients, delousing and inspection of orderlies, and inspection of returned laundry, there is no reason why typhus wards should not be absolutely safe, as I am convinced ours were. Two points of practical detail may be mentioned. First, it must not be concluded, as it was by some of our Polish friends, that since the pubic louse does not transmit typhus the pubic region can be neglected. We frequently found body lice in the hair of the pubic and anal regions, and therefore were careful to clip or shave as carefully there as elsewhere. Second, we found that from the layers of dandruff on the scalps of certain patients lice could be combed even after the most careful washing, and that water prevented the penetration of the kerosene that followed. We therefore excluded the scalp from the washing, depending only on clipping the hair and using generous applications of light oil, and covering with a bandage. Head lice are closely related to body lice, and have been proved to be capable of transmitting typhus infection.

The method of delousing typhus patients is not complicated. In the delousing room the patient is stripped of all clothing while still on the stretcher before he is transferred to the white drained table on which he is to be clipped and washed. The clothing, still on the stretcher, is then taken back through the door of entrance to the steam sterilizer. On the delousing table all head and body hairs thick enough to conceal lice or ova are clipped below the ovum-bearing length, and the clippings are carefully collected so as to be either boiled or burned. The body with the exception of the scalp is then bathed with soap and water and dried. There is some misconception as to the purpose of the bathing. Soap and water do not kill lice; they only remove them mechanically, and if the clipping has not been thorough lice may remain alive among the hairs. Therefore after the bathing and drying, the scalp, axillae, pubic and anal regions should be treated with kerosene or other light oil, and the same should be rubbed lightly over the whole body. The patient is then transferred to a clean stretcher, given a head-cap and night shirt, and taken to his bed. The table and floor of the delousing room should be gone over with kerosene cloths and mops after each patient. The delousing of each patient should be done by two nurses or orderlies; these should be typhus-immunes if

possible, and in any case should wear louse proof gowns and rubber gloves.

In the wards, precautions are to be taken against the entrance of lice, on the persons of orderlies or visitors, in returned laundry, etc. Furthermore, even though the wards are believed to be louse free, all personnel should wear louse proof gowns, sterilized by steam or naphthalene after each wearing, and nurses should confine their hair by a headdress.

But the chief purpose of the commission was to study the pathology and transmission of typhus fever, with the object of identifying the etiological factor. Dr. Wolbach was able to perform 38 extremely complete autopsies on clinically unquestionable typhus cases, all within a few hours after death. From these and by experimental work it was established: First, that, as was reported by Fraenkel in 1914 but had not been universally recognized outside of German medical circles, typhus fever has a distinctive pathology manifested by specific microscopic lesions of the blood vessels. These are most numerous in the vessels of the skin and of the central nervous system, but are present less conspicuously in many other organs and tissues of the body, notably in the heart.

The lesion is to be described as an endangitis. It begins as a proliferative reaction of the endothelium, which results in an accumulation of swollen cells which then undergo degeneration and necrosis. Thrombosis follows, and may cause complete occlusion of the vessel. In capillaries, the initial reaction may result in destruction of continuity of the vessel wall, allowing extravasation of blood as is seen in the petechiae. In the brain these lesions produce minute areas of necrosis. While the characteristic pathology consists of extremely numerous minute vascular lesions, occasionally larger arteries are occluded by thrombosis. Also, and more frequently, thrombosis originating in small vessels of the skin may extend centripetally and result in smaller or larger areas of necrosis of skin and subcutaneous tissue—the so-called typhus gangrene.

These same lesions were also demonstrated in certain instances in skin spots excised during life, in non-fatal cases. So characteristic are the microscopic appearances, that where conclusive proof of the existence of typhus fever is necessary, histologic examination of an excised skin lesion may be done to establish the diagnosis. The presence of these lesions in experimental animals should be required before a transmission experiment is considered positive.

Second: In the endothelial cells involved in these lesions, when stained by Giemsa's method, organisms were found not previously described in human tissues, except by Wolbach and Todd* from the Mexican material, but consistent with those known as rickettsia prowazeki, described by Ricketts, von Provazek, da Rocha Lima and others, in typhus-bearing lice. These organisms are extremely minute. They have the appearance of paired ovoid bacteria, or short bipolar staining rods. They are most easily demonstrable as pairs, 1 to 1.5 microns long, usually surrounded by an unstained space, singly or in clumps. Larger collections of more minute paired forms, may be found filling endothelial cells. They are best shown by Giemsa's stain, taking ordinary stains with difficulty; they are decolorized by Gram's method. As with the organism of Rocky Mountain spotted fever, it has not been possible to cultivate them.

Third: By inoculation experiments, using rather large intraperitoneal injections of human patients' blood, the disease was produced in monkeys and in guinea pigs; and was proved, not only by the occurrence of elevated temperatures after an incubation period, but also by demonstration of the specific vascular lesions in the animals' brains. The finding of these lesions was required in all

*Wolbach, S. B., and Todd, J. L.; *Ann. de l'Inst. Pasteur*, Par., 1920, xxxiv, 153.

results that were considered positive. Examination of an animal's brain by frozen section was found to be a satisfactory time saving method.

Fourth: For investigations involving lice the commission prepared itself by carrying with it, from America and from England, strains of lice free from rickettsia of any kind, and fed only on the persons of members of the commission. Throughout the period of the work the lice fed only on members of the commission remained free from rickettsia, with the exception that one member, Mr. Bacot, developed trench fever, and after that his lice showed the rickettsia pediculi of trench fever, and were therefore not used.

Fifth: Extensive louse feeding experiments were conducted by Dr. Todd. From these it is shown that lice previously free from rickettsia when fed upon patients with typhus fever, particularly in the first ten days of their disease, in a large proportion of instances acquire organisms coinciding with descriptions of rickettsia prowazeki.

In dissecting lice infected with these bodies, it is evident even under low magnification that many cells of the lining of the gut are enormously enlarged. On higher magnification, it is seen that this enlargement is due to distention by myriads of the organisms which I am about to describe. This swelling of the gut cells in lice containing rickettsia prowazeki is important, since it constitutes one of the chief differences by which rickettsia prowazeki are distinguished from rickettsia pediculi of trench fever. With rickettsia prowazeki there is great swelling of gut cells, but the organisms remain intracellular; with rickettsia pediculi there is little swelling of gut cells, and the organisms are largely extracellular.

On high magnification, the organisms in these swollen cells, examined in sections or in smears, resemble those organisms found in the lesions of typhus in man and in animals, but present a distinctly greater variation in size and morphology, ranging from larger bacillary or even filamentous forms to exceedingly minute paired coccoid bodies. A definite cycle of development is suggested.

Sixth: Experiments were made in which the intestinal tracts of lice thus infected with rickettsia prowazeki were injected into animals and resulted in typhus infection in those animals, which was proved histologically. Moreover, a study of the protocols warrants the conclusion that the experimental transmission of typhus, by the method of injecting the intestinal tracts of lice fed on typhus patients into animals, will succeed only when these lice contain rickettsia prowazeki.

A detailed report of the work of the commission is to be published in a volume now in press.

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THE SITUATION ABROAD AS REGARDS TYPHUS FEVER AND OTHER EPIDEMIC DISEASES AND THE POSSIBILITY OF THEIR IMPORTATION INTO THE UNITED STATES

HUGH S. CUMMING, M.D.

Surgeon General, United States Public Health Service, Washington

Read before the Public Health Administration Section of the American Public Health Association, at the Fiftieth Annual Meeting, New York City, November 15, 1921.

BECAUSE of the lack of reliable morbidity reports from Eastern and Southeastern Europe, it is not possible to discuss this problem in an entirely satisfactory manner. For the past two or three years there has existed in Eastern and Southeastern Europe a sanitary situation most menacing to the United States. As bad as the situation was, however, it probably has been

exaggerated in the telling, as illustrated by the statement of one of the Public Health Service officers stationed at the American Consulate at Danzig, who said that the accounts of epidemic disease in Eastern Europe, more especially in Russia, were limited only by the "imagination of the narrator and the credulity of his audience."

While the western and Scandinavian countries of Europe are comparatively free from pronounced foci of typhus, cholera or other epidemic diseases, it is a fact that during the past summer, a number of typhus cases have been reported from Czecho-Slovakia, Hungary, Jugo-Slavia, Poland, and the Balkans, and a few scattered foci appeared in Italy, mostly due to recent arrivals from Czecho-Slovakia or Hungary.

Available reports indicate an improvement in the typhus situation in Europe and it seems very probable from the epidemiology of the disease that this is so, if for no other reason than that the susceptible material will have been exhausted. The Public Health Service despite this probability is proceeding on the assumption that in the winter of 1921-22 there may be an increase in typhus infection in Europe and is continuing the enforcement of sanitary safeguards, applicable at the foreign ports of embarkation as well as at the quarantine stations of United States ports.

Knowing of the general sanitary breakdown in Central Europe coupled with famine conditions and the prevalence of typhus infection in many camps and military prisons just before and at the time of cessation of hostilities, the Service has been apprehensive of the spread of typhus from certain areas of Europe to the United States upon resumption of emigration, which would begin shortly after the armistice. Restrictions to travel during active warfare naturally resulted in a limitation of the disease, although the exchange of prisoners and the movement of armed forces did disseminate some infection. On the cessation of hostilities and the resumption of commercial intercourse throughout Europe, typhus increased both in the number of cases and infected localities, and following this, the reopening of emigration to America, more especially in the winter of 1920-21, markedly increased the danger of the introduction of the infection into the United States.

As just stated, this condition of affairs was foreseen, and at the earliest opportunity we sent medical officers to Europe for the purpose of investigation and to advise preparation for the application of preventive measures at European ports of departure whenever trans-Atlantic travel should be resumed, but in many instances steamship companies failed to heed the warning of medical officers to be prepared, and there resulted an unnecessary delay in the installation of appropriate disinfecting facilities at various European ports of embarkation. In the spring of 1920, one of the senior officers of the Service was assigned to the station at Paris, France, as general inspector of Service activities in Europe, and as the occasion arose officers were assigned to the ports of Danzig, Rotterdam, Antwerp, Cherbourg, Brest, Barcelona, Hamburg, Havre and Athens (Piræus), in addition to those officers who had been stationed for a number of years past at various Italian ports. Later, representatives of the Service were assigned to the Scandinavian ports, to Trieste and Constantinople, and eventually to the English ports of Liverpool, London and Southampton.

The occurrence of typhus on several trans-Atlantic vessels in the summer of 1920 was rather suggestive that a sharp increase of the infection would take place during the following winter, and this proved to be the case. As the winter progressed there was an increase of typhus infection on trans-Atlantic vessels coinciding with a corresponding increase in the number of heavily vermin-infested immigrants arriving on vessels at ports of the United States on the Atlantic sea-

board. There was only a partially satisfactory enforcement of precautionary measures at European ports because of the lack of equipment and facilities that should have been provided by steamship companies or local governments, and to protect our own people instructions were issued early in January, 1921, to medical officers attached to the consulates that bills of health should not be issued to vessels unless typhus preventive measures should have been carried out to their satisfaction. Quarantine officers at ports of the United States were instructed to exercise special care in the inspection of incoming vessels, and to hold in detention for twelve days after delousing measures, the personnel of any vessel arriving from a European port without a bill of health. Furthermore, detention of emigrants for twelve days was carried out at the port of embarkation against travelers from known infected areas.

Although at ports of the United States typhus was detected on ten vessels, it is noteworthy that with the exception of two vessels hailing from Trieste no secondary cases occurred on infected vessels, and it seems reasonably fair to attribute this condition of affairs to the preventive measures carried out by the Service at all the other ports except Trieste, where the resumption of emigration was so unexpected that no Service officer had been assigned and consequently no preventive measures had even been attempted. Upon arrival, one of these vessels, the "San Guisto," had six cases, and twenty more developed during the detention of contacts at the New York Quarantine Station. On arrival at New York the other vessel, the "President Wilson," had four cases of typhus on board, and seventeen subsequently developed amongst the detained personnel. There has never been a doubt in our minds as to the value of the application of preventive measures at the foreign port of departure, but if there ever had been the experience of the past year with respect to the prevention of the introduction of typhus would amply serve to dissipate it.

What the typhus situation may develop in the coming winter season, 1921-22, is more or less speculative, but it can be confidently stated that the force of Public Health Service officers attached to the American Consulates at European ports will amply serve to supervise such precautionary measures as will protect our country against the spread of typhus.

For many years a very large number of emigrants from Central Europe have arrived at the port of entry of the United States in an inexcusably unkempt condition and a very large percentage of them were infected with vermin. While pediculosis is of no special consequence in the absence of typhus, greater care should be exercised with respect to the personal cleanliness of emigrants departing from Europe for the United States as a matter of decency, personal hygiene and self respect, and it is believed that the experience of the past year will have a very beneficial effect, in that steamship companies have established, and presumably will retain in operation at European ports, adequate facilities for bathing and disinfecting prospective emigrants. There is unfortunately a high percentage of vermin infestation reported amongst the foreign element in our larger cities which renders such precaution necessary.

The cholera situation has not been alarming, although it is a subject that has been given consideration. Many rumors have been circulated as to the prevalence of a cholera epidemic in Eastern Europe and it seems probable that there has been a very extensive spread of the infection in Russia; but it appears that the advance to the westward has been stayed, at least in part, by the operation of sanitary camps between the clean and infected countries. Several cases of cholera have been noted at sanitary stations on the Russian border of Poland and some cases in Lithuania during the past spring, chiefly in the neighborhood of Kovno.

Although the average number of aliens detained at the Danzig camp exceeds seven thousand per month, most of them coming from Russia, Poland and Galicia, there has never been a case of cholera observed in the emigrant camp. Should cholera, however, extend to Western Europe or to the seaports, we have confidence in the effectiveness of the measures applied to prevent the ingress of cholera from Italy in 1911, when examinations were performed both at the European port of embarkation and the American port of arrival, and shall at once reinstitute them. It is most satisfactory to be able to say, however, that as yet no case of cholera, nor suspected case, has been observed on any vessels from Europe during the year 1921.

From time to time plague infection has been reported from various ports of Europe, and in order to prevent the extension of the infection to the United States, vessels are being fumigated throughout, under the supervision of Service officers, either at the port of departure or upon arrival at a port of the United States.

While smallpox is reported in various districts of Europe there have been no cases reported during the past summer on trans-Atlantic vessels which, in so far as the emigrant is concerned, is without doubt due to our routine custom of requiring vaccination of persons embarking at European ports, unless they have previously had smallpox or have been recently and successfully vaccinated against the disease.

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EUROPEAN HEALTH CONDITIONS

C.-E. A. WINSLOW, DR. P. H.

Professor of Public Health, Yale School of Medicine; Late Medical Director, League of Red Cross Societies, Geneva, Switzerland

Read before the Third General Session of the American Public Health Association, at the Fiftieth Annual Meeting, New York City, November 17, 1921

IN considering the health problems with which the nations of Europe are attempting to deal, it is first of all necessary to realize the underlying social and economic conditions which render these problems so grave and so difficult of solution. War in the past has always left behind it a legacy of epidemic disease and so far as direct infection of the civilian from the military population is concerned, the great conflict of 1914 to 1918 stands out in sharp contrast to its predecessors; for on the western front at least, the sanitation of the armies was not a menace but an inspiration to civilian health authorities. Social and economic disintegration, however, which has followed from the titanic struggle, has given rise to health problems of the gravest magnitude.

Belgium is perhaps the most normal of all the warring countries; but nowhere in Europe, even among the neutral nations, is there an approach to the relative stability which exists in the United States to-day. England is staggering under an almost overwhelming burden of taxation which is leading to a redistribution of the great landed estates almost as far-reaching as that which has taken place in Russia. France is making notable progress in many directions, but even last summer I travelled over mile after mile of territory which was still a waste of shell holes and barbed wire, with unexploded shells and hand grenades causing their weekly quota of accidents. Germany is working tremendously hard, on an almost minimal level of existence so far as the mass of the population is concerned; her industries are flourishing and she is making and selling goods at a feverish rate. Some of the most competent observers, however, feel her government finance is in such a state as seriously to threaten

national bankruptcy, the results of which would be catastrophic with regard to the entire European situation.

Passing to the east, we find along the frontier of chaotic Russia a line of new and more or less unstable little states stretching from the Baltic to the Black Sea, Finland, Esthonia, Latvia, Lithuania, Poland, Czecho-Slovakia, and Hungary, with Roumania, Jugo-Slavia, Bulgaria, and Greece still further to the south. Of the new states, Czecho-Slovakia is rich in natural resources and relatively stable and prosperous, and Poland is recovering in a remarkable degree from her succession of devastating wars which ended only last autumn. The future of the Baltic States is, however, more than doubtful and Hungary is bitter and dissatisfied and constantly on the verge of war with all her neighbors. The new boundaries have created almost inconceivable barriers to the normal flow of commerce and the vagaries of exchange in themselves offer appalling difficulties to the development of economic life.

The problems of post-war reconstruction are found in their most devastating complexity in the new republic of Austria, which during six and a half centuries of Hapsburg rule grew to be the second largest state of Europe in surface area and the third in population, with Vienna its capital, as the financial, scientific and artistic capital of the whole of eastern Europe.

By the treaty of St. Germain, the wheel of time was turned backward and the mighty but artificial structure disintegrated into its component parts. Czech and Magyar regained their independence, Pole and Jugo-Slav and Italian gravitated to the normal centers of their racial loyalty. Vienna was reduced to the position of the capital of a small and helpless state deprived of its most important industrial resources, the mines of Bohemia, the wheat lands of Hungary, and the pastures of Jugo-Slavia. It became a city of 2,000,000 inhabitants in a nation of 6,000,000, producing only one-fifth of its necessary food supply, poor in essential raw materials, almost without coal, economically dependent on hostile neighboring states, burdened with an army of civil servants and a tremendous load of debts inherited from the ancient empire. The Austrian crown when I was last in Vienna was worth less than one-tenth of a cent, and the natural milk supply of the city, which in 1913 amounted to 850,000 liters, was barely 60,000 liters a day. The cost of living had gone up about one hundred times and the wages of the workers less than fifty times, while among the professional classes it had not risen more than perhaps four or five times. A certain well known professor in the University of Vienna who has eight children was receiving the magnificent salary of ten thousand kronen a month ($10.00) which was nearly half enough to support his family. He is exceedingly fortunate, for his assistant, a man who has served the university for sixteen years, received seventeen hundred kronen a month. The average salary in the state health department was twenty-five hundred kronen a month, about $2.50. There were over three thousand school teachers in Vienna whose income was less than three thousand kronen a month.

The wholesale destruction of the population has been prevented solely by the work of the foreign relief organizations, the American Relief Administration, the American Red Cross, and the Anglo-American Mission of the Society of Friends in the forefront. The American Relief Administraion is to-day feeding four hundred thousand children out of about six hundred thousand in Austria. But the situation among the members of the professional class is desperate. They are living from hand to mouth and from day to day by selling their books and pictures, and when they are all gone no one knows what will happen.

In view of such facts as these, the only wonder is that the public-health sit-

uation is not worse than it is, for after all, the economic factor is a vital one in every public-health problem with which we are called upon to deal. Yet in spite of post-war disorganization, Europe, outside of Russia, has been spared the added horrors of epidemic disease on the great scale which has followed upon earlier conflicts.

A year ago there seemed serious danger of an outbreak of typhus which would threaten the safety of the whole world. With the breakdown of the Russian government, typhus and relapsing fever assumed the gravest proportions in that unhappy country, and with the debacle of the armies of Petlura and Denikin infected refugees poured over the Polish frontier. Of the twenty thousand men, women and children who entered Poland after Denikin's defeat, eight thousand required hospital treatment, six thousand of them for typhus and relapsing fever. The disease naturally spread in Poland itself.

In 1920 there were 168,097 cases of typhus registered in Poland with 22,575 deaths, and 7,185 cases of relapsing fever with 295 deaths. The Polish government, with the assistance of the Epidemic Commission of the League of Nations, has conducted a magnificent struggle against this disease and has organized an anti-typhus campaign of which any nation in the world might be proud. Before the last Bolshevik invasion, the Poles had succeeded in equipping 92 epidemic hospitals with 5,870 beds. Most of them were destroyed by the Bolsheviks a year ago but by April the Polish government had again equipped 117 hospitals with 7,625 beds and had in operation 392 field disinfecting units operating in different parts of the infected region, while two great quarantine stations had been created at Baranovicze and Rowno, where the returning refugees and repatriated prisoners were disinfected on their return from Russia.

The cases of typhus reported in January, 1921, had fallen to seven thousand as compared with thirty-two thousand in January, 1920, while during the past summer the epidemic hospitals were occupied largely by malaria cases instead of the typhus and relapsing fever which filled them when I visited the area last spring.

The Polish government and the Epidemic Commission of the League of Nations and the Hebrew Joint Distribution Commission are devoting themselves to the installation of village baths and the supply of coal and fuel as the most practical measures in a permanent anti-typhus campaign. For the present the menace of typhus has been warded off, and cholera which has also been seriously prevalent in Russia has been kept under complete control, only five definitely diagnosed cases having occurred at Baranovicze.

It is the normal public-health problems of infant mortality and tuberculosis, enormously accentuated by post-war conditions, which to-day constitute the most outstanding challenge to the European health administrator. To take the most extreme cases, examinations made a year ago in Vienna showed nine-tenths of the children between one and six years of age to be in some degree undernourished and one-third to be suffering from rickets, while among children of school age over 40 per cent were undernourished. The tuberculosis death-rate in Vienna increased from 286 in 1914 to 490 in 1919, and Mr. Knud Stouman estimates that in the eleven newly formed countries of central Europe, the tuberculosis death-rate for all ages reaches between three hundred and six hundred per one hundred thousand, which indicates a death toll of some four hundred thousand per year.

It is most encouraging to know, however, the success with which these challenges are being met through the help of foreign relief organizations and the national health departments of each country. Even in the area represented by the present republic of Austria, where the excess of births over deaths amounting to 35,000 in 1914 was changed to

an excess of deaths over births of 71,000 in 1918, there were only fourteen thousand more deaths than births in 1919. Extensive infant welfare campaigns are being carried out in Roumania under the auspices of the Prince Mercea Society, and in Serbia under the child welfare department of the government, while Czecho-Slovakia, Italy and Belgium also exhibit notable examples of constructive work.

Even in Russia the Soviet government has at least an official policy of the broadest kind in regard to public-health education. Its official statements announce that public-health education has been always considered as one of its primary functions; that up to the end of the year 1920 more than fifteen million leaflets, about one million brochures, and eight hundred thousand posters have been distributed; that in each of the thirteen guberneal cities, health museums have been opened, with twenty-six permanent exhibits in the same number of district cities, seventeen traveling exhibits in railroad cars and seven exhibits which are moved on highways for use in places where there is no railroad; that sixty thousand lectures have been given with an attendance of over six million and that health weeks have been organized in different sections of the country with wonderful results.

The Soviet government enjoys certain advantages in this line as indicated by the statement that: "Local support and interest have been preserved in the public through the creation of local committees on the public health in which participation has been made compulsory."

It is to Great Britain that we must turn for perhaps the broadest and most enlightened system of modern public health to be found anywhere in the world. In the child welfare field it will be remembered that the government undertakes to pay one-half of the approved expenditures incurred locally for the salaries and expenses of inspectors of midwives, of health visitors and nurses, for medical aid in pregnancy and during confinement for necessitous women, for the maintenance of infant welfare centers, for the cost of general instruction in the hygiene of maternity and childhood, for hospital treatment for necessitous women and for children under five years of age found to need in-patient treatment, for the cost of food provided for expectant mothers and nursing mothers and children under five years of age in necessitous cases, and even for experimental work for the health of expectant mothers and of infants and children under five years of age.

The result of this enlightened policy has been the reduction of the infant mortality rate for England and Wales to eighty deaths under one year per thousand living births for 1920, as against eighty-nine for the previous year, and one hundred and eight for 1913. Similar provision is made by the national government for the payment of one-half of the cost of local tuberculosis schemes, including the appointment of whole time tuberculosis officers, dispensaries, residential institutions, and plans for follow-up and after care. Last summer Sir George Newman reported that England and Wales had three hundred and forty-one tuberculosis officers, four hundred and twelve tuberculosis dispensaries, and eighteen thousand beds for tuberculosis patients in sanatoria and hospitals, with thirty-five hundred more beds in preparation. The number of notified cases was 73,332 in 1920, with 42,545 deaths.

In connection with venereal disease, opinion in Great Britain is averse to notification and compulsory treatment, but remarkable progress has been made along voluntary lines in the better education of practitioners and students in the diagnosis and treatment of venereal disease, in the provision of free laboratory facilities for diagnosis, in the establishment of treatment centers and the free supply of arsenobenzol compounds, and in popular education. In 1920 the public treatment centers of England and

Wales reported 100,632 new patients, with 1,460,541 clinic visits, a most remarkable record.

Among the important special events of the spring and summer in Europe were the regional conference on venereal disease held under the auspices of the League of Red Cross Societies at Copenhagen, May 20 to 25, and the meeting of the International Union against Tuberculosis in London at the end of July.

The Copenhagen conference included the seven northern European countries, Denmark, England, Finland, Germany, Holland, Norway, and Sweden, which are among the most advanced nations of the world in regard to this subject. Germany and Finland are abolishing the regulation of prostitution in the immediate future, a step which has already been taken by all the other countries concerned. Denmark and Sweden are the pioneer nations in the organization of medical treatment of venereal disease. Universal free treatment was recognized as a principle in Denmark in 1790, and Sweden introduced the system of anonymous notification in 1817. In both countries reporting is now by number and the patient must continue under treatment until cured on penalty of a report to the health authorities of the name of the delinquent; and these laws are not merely placed on the statute books, as in this country, but are really enforced.

Hospital facilities and dispensary facilities are freely provided. Copenhagen, for example, has four hundred hospital beds for venereal cases, or one bed for two thousand population, and quack treatment in the Scandinavian countries is almost unknown, nine-tenths of the cases being treated not only by physicians but by qualified specialists.

In the educational field the Ministry of Health of Great Britain is coöperating with the National Council for Combating Venereal Disease, which spent twenty-five thousand dollars on newspaper advertising alone in the year ending last March, and received nearly thirty-five thousand letters of inquiry as a direct result.

As to sex education in the elementary schools, opinion in England is on the whole averse, but in Sweden, where education does not cease at fourteen but continues up to the age of sixteen, a royal commission has recently presented an admirable report recommending an extensive and detailed system of sex education in the higher grades.

The meeting of the International Union against Tuberculosis was chiefly notable for a scholarly address by Dr. Calmette on the principles underlying the control of tuberculosis and for an admirable exposition by Sir George Newman of the principles underlying the practical control of this disease. Dr. Calmette strongly emphasized the difference between the acute and highly communicable form of tuberculosis that occurs in children and among races that have not been exposed to this infection, and the comparatively mild form which occurs in the ordinary adult population which is largely protected by immunity acquired in childhood. In the important series of excursions arranged by and in connection with the meeting of the International Union, many of us were particularly interested in the industrial colony for the convalescent tuberculous at Papworth Hall in Cambridgeshire, where the patients pass from the hospital to a group of one man chalets for sanitarium treatment, then to hostels where they begin to learn a trade, and finally to normal family life in the village community adjoining, where the recovered patients earn a large share or the whole of their living in the wide group of industries maintained for the colony.

It is impossible to allude even in the briefest way to the public-health situation in Europe without reference to the organization, after many difficulties and tribulations, of the Health Committee of the League of Nations, which promises

to play a most important part in the health situation in the future.

When the Covenant of the League of Nations was first drafted, it was realized that one of the many important tasks of the new machinery of international coöperation to be created was the promotion of the cause of public health. The need for an effective agency in this field, to assist in the standardization of vital statistics, in the collection and dissemination of information in regard to the prevalence of epidemic disease, in the development of port sanitation, in the negotiation of international sanitary agreements and in dealing with public-health emergencies of international importance was obviously an urgent one.

The Office International d'Hygiene Publique in Paris, operating under the convention of Rome drawn up in 1907 was well equipped from a statutory standpoint to fulfill many of these functions, but the financial resources of the organization are wholly inadequate for the effective exercise of any of them. The Covenant, therefore, constructed its new international health organization upon the foundation of the existing Office which was to serve as the general committee of the new organization and to appoint six of the thirteen members of the standing committee of the League of Nations. The advantages of the plan proposed were so obvious that it was approved by all public-health workers without reserve and was to have been put into execution last June.

The plan for formal coöperation proposed in the Covenant required certain minor modifications in the convention of Rome, and the United States, in pursuance of its unfortunate policy of blocking the work of the League of Nations in every possible manner, refused (as one of the signatories of the convention of Rome) to permit these modifications to be made.

For a time it seemed as though the whole ideal of an effective international health organization must be abandoned. Technicalities have, however, happily proved powerless to prevent an understanding, demanded by the common sense and mutual good feeling of all the forces vitally concerned. On the initiative of a preliminary conference of certain members of the proposed new health committee of the League held in Paris on May 5, the Council of the League appointed as permanent health secretary, Dr. Rajchman, the brilliant chief of the Polish Health Service, and named a provisional health committee of members who were to serve in their individual professional capacity but who were at the same time so selected as to include all the factors to have been represented on the committee projected in the Covenant.

This provisional health committee which included among its thirteen members nine of the most influential members of the committee of the Paris Office, displayed a most admirable spirit of coöperation and finally succeeded in working out a plan by which practically complete coöperation will in effect be secured without alterations in the convention of Rome, and the committee proceeded at once to plan for the organization in the secretariat at Geneva of a much needed international service of epidemic intelligence and sanitary statistics and for the continuance of the work of the anti-epidemic commission against typhus in Poland.

Finally, if I may be permitted, I should like to say a word in regard to the work of the League of Red Cross Societies with which I, myself, was connected while in Europe. The League of Red Cross Societies was established on the initiative of Mr. Henry P. Davison of the American Red Cross, with the primary objective of developing the Red Cross Societies of the world as continuing and constructive forces in the public-health campaign. I need not emphasize here the need for an effective mobilization of an intelligent public sentiment in behalf of the modern public-health campaign, and I think most of us have felt that if gen-

eral health propaganda is to reach a maximum of effectiveness it must be directed toward the organization throughout our cities and towns of permanent and active committees of public-spirited citizens devoted to the support of official agencies and the enlisting of public support for an active participation in this work.

No body seems, theoretically, so well fitted to carry out such an organized campaign as the Red Cross, free from political and sectarian influence of any kind, world wide in its organization, and of vast potential membership. From the Red Cross side it is equally clear that unless the organization is to relapse into something approximating its prewar condition, a definite and continuing objective is essential, for neither the care of disabled soldiers nor the preparation for disaster relief, admirable and essential as these two aims may be, can furnish the inspiration for a great and growing organization.

The objective of the League of Red Cross Societies is, then, to develop the national Red Cross societies from war relief agencies to constructive health forces in normal peace time. The task is not a simple one, and the lines of development of the League itself were by no means clear when it was established two years ago, but we believe that to-day the League is organized on a modest but effective basis for service of this kind.

The Red Cross Societies of Canada and Great Britain, of Italy, Belgium and Czecho-Slovakia are already more or less definitely committed to a broad and constructive program of education and organization for community health betterment, and the interest in Europe is so great that the permanent existence of the League of Red Cross Societies after the present American funds are exhausted is now practically assured. We may hope and believe that in many countries the great Ninth Crusade which we preach to-day against preventable disease will secure through the agency of the Red Cross the widespread public support which alone is necessary in order to secure the brilliant victories within our reach.

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Child Welfare. *The Annals of the American Academy of Political and Social Science, Nov., 1921, Vol. XCVIII, No. 187. Editor in charge, James H. S. Bossard.*

This volume is one of the comprehensive symposia treating single great socio-economic problems which we have learned to expect from the *Annals of the American Academy.* Although its editor apologizes for the omission of certain subjects from the discussions, such as recreation, the volume seems remarkably complete in its emphasis upon the fundamental principles which Miss Lathrop restates in her own paper, and which have come to be widely accepted as the classic "standards of child welfare" of the Children's Bureau.

Dividing the field into two main parts, "Positive Welfare for All Children" and "Problems and Programs Involving Special Groups of Children," the editors have put health foremost among the positive factors, treating it under two main heads, "Conservation of Life and Health" and "The Mental Hygiene Movement." Contributors to the first of these groupings are Dr. R. A. Bolt, on infant mortality; Dr. Ellen C. Potter, on community organization for child hygiene; Miss Harriet Leete, on positive health; Dr. E. V. McCollum, on nutritional problems, and Edward T. Hartman, on oral hygiene. Under mental hygiene, Drs. Leonard Blumgart, William A. White, Jessie Taft, and Frederic H. Knight discuss various problems of normal and abnormal childhood and adolescence from the psychiatric and psychoanalytic points of view.

K. M. G.

THE PREVENTION OF TUBERCULOSIS BASED ON THE RELATION OF TUBERCULOSIS IN INFANCY AND CHILDHOOD TO TUBERCULOSIS IN ADULT LIFE

ALLEN K. KRAUSE, M.D.

Managing Editor, The American Review of Tuberculosis, Johns Hopkins Hospital, Baltimore

Read before the Child Hygiene Section of the American Public Health Association at the Fiftieth Annual Meeting, New York City, November 17, 1921.

AVAILABLE data can hardly warrant an extreme position on the dictum that manifest, adult, human tuberculosis, particularly of the lungs, is the fruition of an infection acquired in childhood. Against the familiar facts that most city children become infected, that infection confers an immunity to reinfection, that infection is almost habitually notoriously persistent, and that primary outbreaks of clinical tuberculosis can frequently and with unexceptionable proof be shown to have emerged from a background of years-old infection, can be opposed the equally well-authenticated circumstances that tuberculo-immunity is never more than relative, that it declines as lesion becomes more sclerotic and, therefore, less susceptible to activation, that tuberculous infection (lesion) is not necessarily permanent, that both experimental and clinical observation prove that lesion may become sterile and thoroughly eradicated, that in this event immunity disappears, that the remarkable divergence of localization of pulmonary infection and disease suggests that the more peripheral lesions of adults represent reinfections from without if we would hold to the inhalation concept of lung infection, and, finally, that all animal experimentation proves, not that infected immunes cannot be reinfected, but that the results of reinfection are a modified tuberculosis, more localized, more chronic, yet on occasion still very protracted, as compared with the course of virulent infection induced in a nonimmune.

Estimates, then, of what proportion of adults fall ill from postpuerile infection and what ratio from childhood exposure are usually founded on bias and imagination. We have no way of accumulating the evidence that will give them scientific weight. No one has yet kept careful records, from infancy to and through adolescence, of the ups and downs, the appearance, disappearance and reappearance of the Pirquet reaction, that index of infection, in more than ten of the millions of infected children. It may be that for longer or shorter periods we would find that a large proportion would exhibit nonreactivity, and therefore noninfection, where reaction and infection had been shown before; and further, that many of these would later again give the test of infection, in their case, reinfection. What little has been done in the way of prolonged and continued observation of the response of the individual child to infection tests—and it is little enough—has been concerned with clinic children, most of whom were under observation for an infection which had become so well established, had developed to such a point, that illness or abnormality was noticeable; and we must admit that the possibilities of the subsequent course of infection in these children would be quite different from those of the very slight and presumably transient infections that might follow the almost negligible exposures which many others experienced.

But all this is speculation, even though it attempts to take into account compelling consequences of scientific observation and social and family relations; and would indicate, also, only one or two of

the many wide gaps of knowledge which must be filled in before we may become too dogmatic about the obligate development of adult tuberculosis from childhood infection.

Yet, that childhood infections are prolific breeders of adult tuberculosis cannot be denied. Anyone who comes in contact with many adult consumptives needs no better evidence of this fact than good and thorough histories, which may be pieced together after adroit cross-examination of the patients. Scores of these will satisfy every requirement laid down by the most uncompromising proponent of the puerile genesis of adult disease, and physical examination as it brings to light anatomic evidences of hidden, always silent and never-suspected residua, will not infrequently clinch past history.

So much seems incontrovertible. The limitations of time forbid the arrangement of reasons which urge belief in the truth of another proposition which is pertinent to my subject, the proposition that tuberculous infection, once established, responds to the tissue activities which are set in motion by all events which enter into human experience; or, more concretely expressed, that factors of environment and inheritance, through their effects on the tissues of the body, and thus on tuberculous lesions which the latter environ, exert a determining influence on the course of infection. Under their interplay, combination and balance, infection advances and retreats, comes to light as clinical disease or is dampened into inactivity or smoulders in obscurity, for longer or shorter periods, indolently or fulminantly, continuously or haltingly. Since the wellsprings of inherited factors are largely beyond our control, these will receive scant attention; their effects are, moreover, modifiable by environmental factors. Therefore, within the short compass of this paper I wish merely to enumerate a very few of many measures which would promise a reduction of that adult tuberculosis morbidity which develops from childhood infection a few measures which may seem practicable of application.

These measures would take the incident of infection for granted and proceed with the sole purpose of preventing at any time its development, or restricting this to a minimum. It is fair to assume that if all infection were kept thoroughly inactive throughout the years of childhood it would become so sclerotic and well invested that practically no adult disease would develop from it and that, which is more sigificant, much more of it would completely die out.

It should hardly be necessary to point out that, taking any population or portion of it in the mass, whatever tuberculosis exists in it will respond delicately and definitely to customs, habits, modes of life, and economic and civic conditions, as these affect the housing, food supply, sanitary facilities, working conditions, opportunities for recreation and employment of leisure, etc., of a community. If all these are comprehended in what we call public hygiene, then we shall find almost inevitably that where this is good and effective, tuberculosis cases and deaths are relatively few, and where it is bad or ineffective, they are many.

This universally noted circumstance gives us the clue toward what direction our efforts with children must take. Without analyzing the factors which cause tuberculosis to reflect the state of public hygiene, I would point out more explicitly where our efforts should, it seems to me, be concentrated.

Because the foundation is in existence, and much of the machinery is here, and there remain only details of execution to fashion and refine, it would appear that the schools, public, parochial and private, are the most promising media through which tuberculosis prevention is to be accomplished. There is at present much in the air in the way of plans and programs and design, much that is sound. But how far do performance and execution fall short of what *could* be done!

Almost every child still contracts measles, and all of them frequent colds; and in most instances these maladies originate from school exposure. Add to these the number of cases of preventable whooping cough and diphtheria and tonsilitis and sore throat which are passed around in school, and we obtain an enormous case aggregate of obviable causes, which in many instances have a good deal to do with bringing out manifest tuberculosis—in neck nodes and in lungs and thence to bones and joints and even meninges. Or, it may be, in thousands of patients these intercurrent infections give renewed life to tuberculous infections which were just about to die out and which, even though they caused no appreciable trouble in childhood, acquire a new stability which carries them along for years more, and even into adult life.

It was perhaps inevitable that our laudable legislation to compel attendance at school should increase the opportunities for the spread of communicable diseases and that the latter should outrun our efforts at control. But it is not so inevitable that we cannot catch up. Prevention of contagion—the means and skill to detect foci, the removal and segregation of carriers at the proper time, the keeping of weeds forever out of schoolrooms—means much more continuous and relentless attention to duty than periodic attendance on the sick; it requires much more and better medical service, much more honest and enlightened officials and much better informed public opinion than now exist in most places. To keep five hundred school children, or less, reasonably free from preventable and transmissible diseases might well require the full time of an active physician. A political hack or favorite, such as the everyday run of doctor-politician, a man, as a rule, of uncertain income in practice, of little skill in the detection of disease, cannot and does not look after ten children efficiently. The time is coming when this work of school physician is going to be done by only the very best men who are specially trained for this task, who give all their time to it, and who, as a corollary, are going to be paid accordingly. This is the goal which every health body should aim at, the end that it should speed. Let us get together and work harder than ever to do away with this endless succession of preventable minor — and major — disabilities which stir up tuberculous infection in our children; it will mean big future dividends.

There must be something in our manner of life which is producing the enormous incidence of diseased teeth, hypertrophied or incompetent tonsils and adenoid growths in the nasopharynx in our children. At any rate, few reach ten years without some one or all three of these affections. Buccal and pharyngeal irritation or infection has, as is commonly observable, a peculiarly intimate effect on the cervical lymph nodes. And once we reflect that these nodes adjoin and drain the two major portals of entry of tubercle bacilli, that they are the most frequent sites of clinical tuberculosis in children, that, for every case of manifest disease there are certainly several times as many infections, and that tuberculous infection within them is markedly affected by any disturbance of their normal function, we begin to realize how much healthy mouths and throats may mean in the prevention of tuberculosis. To attain maximum mass results in this respect we again have no better medium than organized prophylactic efforts in the schools. My formula once more would be more school physicians, on full time and paid in a way to attract and demand the best talent; and, from the point of view of tuberculosis, a thorough appreciation on their part that the original excitant of tuberculosis in children is often a diseased mouth or throat.

As more physicians become familiar with the masked and obscure manifestations of tuberculosis, which are met with more frequently in children than in adults, they will prevent many later and more serious outbreaks of the disease.

Many children are coming to our clinics with minor eye affections, usually phlyctenular conjunctivitis. Sometimes these antedate the appearance of tuberculous lymphadenitis or pulmonary disease, while at other times they occur during the course of these; but in a good many they may exist alone, and our experience leads us more and more to believe that an underlying tuberculosis is the etiological factor—an opinion which is gaining wider and wider currency.

Such cases of eye disease should be treated for tuberculosis and not merely locally. Taken in time and put under a modified tuberculosis regimen, they respond well and escape frequently the clinical evidences of more advanced infection. They are frequent in children, and their recognition and handling as tuberculosis constitute prophylactic work of the first order. There are, besides, other children who may exhibit their infection, for a time at least, only by skin eruptions, of which several are now pretty satisfactorily determined as of tuberculous origin. Those who are taken in hand and treated for tuberculosis, and not allowed to go their way after the application of ointments and powders, will again in many cases fall out of the ranks of future consumptives.

The prevention of adult tuberculosis which can be done by quasitherapeutic institutions like the open air school, or schools adapted to the peculiar needs of delicate children, is incalculable; they will repay any amount of development. What children themselves assimilate from such movements as that of the Health Crusaders cannot be estimated; but the conclusion is inescapable that thousands will carry precept and practice, even though imperfectly, through childhood and into later life, and will translate into action and habit, health practices which on occasion will turn the scale in favor of the continuation and permanence of the inactivity of long standing infection.

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THE PREVENTION AND CURE OF RICKETS BY SUNLIGHT

ALFRED F. HESS, M.D.

New York City

Read before the Child Hygiene Section of the American Public Health Association at the Fiftieth Annual Meeting, New York City, November 15, 1921.

RICKETS is the commonest nutritional disorder occurring among infants. In spite of this fact little interest has been manifested in it, either by the clinician or by the laboratory investigator. Its status from an etiological point of view was, until recently, much the same as it had been for the past 250 years, from the time when Glisson and his associates recorded its appearance in England. Broadly speaking, it may be stated that physicians have been divided into two camps regarding its origin, some believing the main cause to be dietetic, and others ascribing its occurrence to faulty hygiene.

During the past few years renewed interest has been aroused in the study of rickets, both in this country and abroad, owing to the fact that some have ascribed it to the lack of a vitamine, and also because it has become possible to produce the disease with regularity in animals. Studies, however, have not progressed sufficiently far to harmonize opinions as to its causation. The well known investigations of Mellanby[1] have led him, and others, to the conclusion that the nutri-

tional alterations are due to a deficient diet, the lack of a vitamine identical or closely associated with the fat-soluble vitamine; whereas the work of Findlay and Paton[2]—clinical as well as experimental—have led to the deduction that the disorder is to be ascribed to hygienic factors.

In previous communications I have taken the position that although a faulty diet may lead to the development of rickets, a lack of vitamines is not the dominant cause, for infants develop this disorder in spite of obtaining adequate amounts of these unidentified food factors. Some years ago we went a step further, and attempted to correlate the diet of nursing mothers with the occurrence of rickets in their offspring. A study was made of the diet of the negro mother in New York City,[3] for, as is well known, negro babies are particularly prone to rickets. The result of this investigation may be summarized by the statement that the diet of these mothers was found to be lacking particularly in fresh vegetables.

Defective hygiene may be interpreted in many ways. The majority have understood by this term, a lack of fresh air, an accumulation of poisons due to overcrowding and confinement in poorly ventilated rooms, whereas others, notably Findlay and Paton, have stressed more especially a lack of exercise.

For some time I have been actively interested in the relation of light to the development of rickets. My attention was directed to this aspect of the question on account of the striking seasonal incidence of rickets, which, as you know, occurs with marked frequency during the winter and spring months, decreasing and almost disappearing with the advent of summer. Based on this phenomenon, an attempt was made some years ago to cure rickets by means of the ultraviolet ray. Our results then were inconclusive. More recently Huldschinsky[4] has made use of this therapeutic measure with definite success, using the mercury-vapor quartz lamp. During the past year Dr. Unger and I have been treating cases of mild rickets which developed on the usual diets (ordinary formulas of milk, orange juice, and in the case of older infants, cereals), with frequent short exposures to direct sunlight.[5] The results have been most encouraging. The infants have not only improved in general vigor and nutrition, but the signs of rickets have rapidly disappeared under this treatment. The babies were exposed to the sun for 15 minutes to an hour, first the legs, then the arms, and, when the weather was mild, the chest and back. At all times the period was regulated according to the outdoor temperature as well as to the sensitiveness of the skin of the infant. It is evident that no rule can be formulated in this regard, but that one must be guided by the reaction of the individual child, for example, whether it has a tendency to tan or to burn. The sun's rays must impinge directly on the skin, and not pass through the window pane or be obstructed by the baby's clothing. The treatment was given every day when possible; as a matter of fact, it could be carried out but four to five times a week. It was found, without exception, that the signs of rickets rapidly disappeared under this therapy. The beading of the ribs diminished, the characteristic signs as seen by the X-ray became obliterated, with a definite increasing deposition of inorganic salts at the epiphyses of the long bones. These clinical and radiological manifestations of healing were substantiated by chemical evidence. Recently Howland and Kramer[6] have shown that rickets is accompanied by a diminution of the inorganic phosphates of the blood. Following some weeks of heliotherapy, it was found that the inorganic phosphate content in our cases gradually increased in amount and reached normal.

As stated, rickets can be brought about with regularity in animals. In this country rats have been used for these ex-

periments, in England dogs have been employed. A distinction may be drawn between rickets in animals and in human beings, in that it develops in children on the liberal diets in common use and no one type of diet has been identified with its incidence. Without going into detail of the animal investigations, it may be added that we have found the sun treatment quite as efficacious in the rickets of rats as in infantile rickets. If rats are exposed to the sun's rays for intervals of 15 to 30 minutes daily, they can by this means regularly be protected against rickets, whereas animals fed on the same diet, but kept at all times in the dark, develop rickets in all instances.

DISCUSSION

That rickets can be prevented or cured by sunlight does not imply that light is the only agent to be relied upon as a therapeutic measure. It should not be forgotten that we possess a specific for rickets, that cod liver oil can be relied upon for its prevention or cure. In a study of rickets carried out a few years ago by Dr. Unger and myself among the negro babies of the Columbus Hill district of this city,[7] the efficacy of cod liver oil was clearly demonstrated. As a result of this experience, and that of others, we stated that rickets could be eradicated from New York City by a yearly expenditure of about $100,000 for cod liver oil.

What we wish to emphasize more particularly is rather the prophylaxis against rickets. At the present time it is impossible to state the comparative rôles of dietetic and of hygienic factors in its etiology. Probably their influence varies at different times and under different circumstances. During the war, defective diet, no doubt, was a potent factor in increasing the incidence of rickets in the Central Empires. In New York City I believe that lack of sunlight plays a very important rôle in its development, and I am strengthened in this view by the marked seasonal incidence which it evinces.

Now that it has been shown that sunlight is a valuable preventive and curative measure in rickets, those active in infant welfare will have to regulate the care of the baby so that it is not deprived of this simple and beneficient therapeutic agent. At the present time infants are swathed from head to toe in clothing, so that the sun can fall only upon their faces; even in the mildest weather their bodies receive little direct sunlight. Such habits should be altered. If the baby is in the sun, its arms and legs may be bared without causing discomfort. In cold weather the body must be particularly well wrapped, and the hands and feet protected, but the arms and legs may be exposed.

It is evident that a corollary of the benefits to be derived from sunlight is the need of improving the housing conditions of the poor, and the elimination of the dark tenements which shut out all the sunlight. This gospel is applicable to children's wards in hospitals and child-caring institutions, and should lead them to increase their provision for outdoor treatment, roof wards and solaria. The solaria must not, however, be enclosed in glass, for, although the light and heat rays penetrate glass, a large part of the radiations which cure rickets are lost by the rays traversing the window panes.

The fact that sunlight plays an important rôle in the development of rickets certainly explains, to a large degree, its distribution and the comparative freedom of the children of the tropics and in the countries where an outdoor life is followed. No doubt this is not the only factor involved.

These clinical results, confirmed by laboratory experiments, show that, although we have realized the importance of light in the growth of plant life, we have accorded it too little significance in the development of animal life. We have known that a growing plant cannot thrive in the dark, but have failed to realize that the same laws apply to growing ani-

mals. Infants have been the chief sufferers from this lack of understanding, and the development of rickets one of its unfortunate results.

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Organizing an Anti-Malaria Campaign.—The following outline shows the program for county-wide malaria investigation and control under which the work of the central administration unit of the Alabama State Board of Health has been carried on, with gratifying reductions in morbidity and public expense. Some of the results for 1921 are reported in the State Notes section of the JOURNAL.

This program has the active coöperation of the U. S. Public Health Service and the International Health Board, and may well serve as a suggestive model for other communities where the malaria problem is prominent.

I—Instruction of county health officer by malaria control expert in:

1. Catching and identification of species of mosquitoes, including larvae, pupae and adults.
2. Essentials of drainage, oiling, use of fish and larvicides.
3. Essentials of screening and quinine control.

II—Surveying of and work in communities suitable for work by county health officer and malaria control expert.

1. Organization for work determined by local conditions.
2. Work under supervision of county health officer.
3. Inspected regularly by malaria control expert.

III—Work in rural places by county health officer.

1. Institutions.
2. Farmers.

IV—Educational and publicity work; under control of county health officer, advised and assisted by malaria control expert.

1. Personal conferences, lectures and demonstrations.
2. In schools.
   a. By health officer: demonstrations.
   b. By teacher: use of "Malaria Primer."
3. Exhibits and demonstrations at county fairs, chautauquas, etc.
4. Distribution of literature, placards, etc.
5. Newspaper articles.
6. Work with boys' organizations.

V—Prevention of future man-made Anopheles breeding places.

1. By coöperation with railroads.
2. By coöperation with county officials and road builders.
3. By coöperation with farmers and manufacturers.

VI—Promotion of drainage districts, and tying up of malaria with large agricultural drainage projects.

VII—Collection of malaria and mosquito statistics by the county health officer.

1. From doctors: reports and statements.
2. From officials: statements.
3. From school children: statements, possibly spleen examinations and blood smears.
4. By malarial census in chosen places.
5. By use of "spot map" to indicate relative prevalence in parts of county.

VIII—The state malaria expert and assistants who:

1. Survey each county and advise the county health officers as to what places to control and how to control them.
2. Instruct county health officers in malaria control work.
3. Inspect work in counties regularly.
4. Collect all data and information in counties and from outside and acquaint all health officers with it.
5. Keep records of all work being done throughout state.

REPORT OF THE COMMITTEE ON PREPARATION, PACKING AND TRANSPORTATION OF FOODS

Read before the Food and Drugs Section of the American Public Health Association at the Fiftieth Annual Meeting, New York City, November 18, 1921, and recommendations approved.

THE economic consequences of the war has perhaps exerted no greater influence on any industry than the food industry. The impetus to greater food production in order to meet the increased demands of Europe and this country during the war has now been succeeded by a retrenchment in production, carried in some instances to a point lower than in prewar times.

With the market of the European countries greatly diminished as a result of their financial inability to buy, production of those foods which before and during the war were exported in great quantities naturally dropped in accordance with the inexorable law of supply and demand. With the decline in exports, the first result was the glutting of the domestic market followed by reduction in prices which, in turn, inhibited production. If continued in the case of basic foods, this curtailing of production may go on to the point where public health is seriously damaged.

When production is on the downward path there is but little stimulus to search for newer and better methods of food preparation, and that, in a general way, is true of the past year.

The increased freight rates which went into effect last year undoubtedly had an important effect on production of foods. Railroad rates were raised to the highest level they have ever reached in this country on August 26, 1920, when advances of twenty-five, thirty-five and forty per cent were authorized by the Interstate Commerce Commission in the southern, western and eastern districts, respectively.

Only about eight weeks after this final advance in freight rates there was a sudden, sharp and apparently unexpected decline in industry generally. With the practical collapse of foreign markets and decreased demand in this country, many of the basic food products fell to prices as low as or lower than the prewar level, while freight rates continued at their peak. It was reported in many instances that growers of fruits were unable to obtain in the distant markets to which their products had been shipped, a sufficient price to cover the freight charges to market. It is, of course, true that this reduction in the price of many food commodities was not brought about by the high level of freight rates, but it is equally true that the continuance of a high level of freight rates concurrently with the immense drop in commodity prices, is a factor tending to discourage production, and it is hoped that as one of the factors involved in the general readjustment, freight rates on important food articles may be substantially reduced in the near future. Some effort has been made along this line. Substantial reductions have already been made in line haul livestock rates and in rates on fruits from the Pacific Coast to eastern consuming points. The Interstate Commerce Commission has also just ordered a reduction in the rates on wheat, coarse grains, and grain products, such as flour, which will remove half of the advance of August 26, 1920.

The problem is not easy of solution, because it is urged by the railroads, and perhaps with entire truth, that they cannot reduce their freight rates so long as the general volume of traffic continues abnormally low and wages and working rules bring about abnormally high operating costs.

It is sincerely to be hoped, however, that those charged with the direction of these important matters will find some method of accommodating the situation to the changed condition brought about by the readjustment following the war.

The admonition and advice to econ-

omize in food dictated by necessity during the war have undoubtedly left a more or less permanent effect on the public at large, and the business and industrial depression which followed the beginning of the readjustment period not only did not remove the urgency for food economy, but on the contrary, gave it added stimulus.

More was written on the subject of diet and food economy during and since the war than perhaps in any similar period, and indications are that this will continue. Dietetics is a very popular subject just now both for writers and speakers, and hardly a day passes without some dietetic advice appearing in the daily press or in the magazines on some phase of diet and nutrition.

As is to be expected, among the mass of what is written and said about the subject is considerable speculation and faddism, and the authors cannot always lay claim to scientific attainments or careful observation and study. However, valuable original research had been reported from a number of the leading American investigators in the field of nutrition whose efforts were greatly stimulated during the war, and it is to be hoped that they will continue their work because the need for such work is as great as the benefit to be derived from it is of tremendous importance to the public health.

It is admittedly true that the science of dietetics has been grossly neglected heretofore, particularly in medical schools. Hardly any emphasis is placed on the importance of diet both in health and disease. Few medical schools have chairs in dietetics. It is merely touched upon in the general teaching of physiology and is again referred to briefly in the study of the treatment of individual diseases.

There are unmistakable signs, however, which prove that this state of affairs is changing. Many colleges, universities, and hospitals are now giving courses in dietetics, or dietetic teaching is included in the general subject of domestic economy. In addition, a number of scientific bodies of high caliber have laid out programs for extensive study of the various problems of nutrition and food production, notably the National Research Council through the proposed National Institute of Nutrition.

That economic food production, preparation and distribution is looked upon as important to public health is seen from the fact that a Food Research Institute has been established at Leland Stanford Junior University by the Carnegie Corporation, with an endowment of $700,000.

According to announcements, the Institute will study all problems of production, distribution and consumption of food, and judging from the personnel of the directorate, important results can confidently be expected from their work.

The ideal diet of civilized man is one composed of food in proper proportions, both from the animal and vegetable kingdoms, and since an adequate supply of food animals depends on the availability of sufficient feed on which to raise them, it is apparent that the question of utilizing the feed so as to get the most human food in return is important.

Animal nutrition, as far as it affects the value of animals as converters of vegetable food into food for human consumption, has always been the subject of considerable study, but it received increased attention during the war because of diminished supply both of fodder and animals in some countries.

According to a previous report of another Committee of this Section which was published in the AMERICAN JOURNAL OF PUBLIC HEALTH, some observers have stated that more human food is obtained in calories through the milch cow than the beef steer. In other words, it is claimed that the cow will produce more human food in the form of milk, veal and beef from her own carcass from a given quantity of feed stuff than will the beef steer; or that it takes more feed stuff to produce a pound of human food by feed-

ing it to a beef steer than by feeding it to a milch cow.

Because of this and because milk is relatively rich in vitamines and calcium, it has been recommended: first, that more milch cows and fewer beef steers shall be raised, and second, that less meat and more milk be included in the diet.

It can probably be demonstrated by calculations that the cow will return more human food in calories than the beef steer, provided the same results are always obtained in the feeding and breeding, and certain side effects are not taken into consideration, and for a short period during a shortage of feed stuffs it might be advisable to favor the milch cow. It is, however, seriously to be doubted if a long continued increase in milch cows and decrease of beef steers would result in economic or other benefit to the consumer. The advocates of an increased milch cow production claim that the cow produces more food in the shape of milk and veal and beef than the steer, but in making a comparison of the value of these two types of animals there are certain facts that should be given consideration. The economic loss occasioned by condemnation at time of slaughter is far less in the case of beef steers. The loss on the side of cows is due to the drain of repeated pregnancies and lactation predisposing to tuberculosis.

If more energetic eradication measures were taken, a gain in production of beef, veal and milk would soon be attained that might outweigh any gain that can be hoped for by an increased production of cows at the expense of a decrease in beef steers, because it is a well-known fact that certain diseases are communicable between farm animals, particularly cattle and hogs.

Another important consideration that must be taken into account when figuring what the cow returns for human food is the fact that abortion often cuts down the yield both in milk and veal. Again, beef steers are better adapted to range lands that are now producing a large percentage of our beef supply, and the decreased labor involved in the production of beef steers is an important economic factor.

We must also consider certain side effects that would surely follow an increased cow and decreased beef steer production and which are of economic importance to the consumer.

A reduction in the number of steers would result in a material decrease in beef fats that are adapted to many food purposes. A diminished number of steers would also mean a lessened supply of steer leather which is considered best for shoes; also a diminished supply of tallow, gelatin, glue and other articles of daily use.

All of this must be seriously considered in the economics that are involved in the advocacy of a reduction in beef steers.

Edmund Coultey, discussing lacto-vegetarianism, stated quite some time ago:

"Carried out thoroughly to its logical conclusion, it would have a most profound effect on life generally. Under such a scheme of diet all animals except those used for draught purposes and pleasure would gradually be abolished. Were fowl only kept to supply eggs and feathers, the price of eggs would rise considerably. So, too, the supply of milk would be insufficient and its price prohibitive, for cattle could not be kept profitably for the supply of milk and leather alone. Woolen clothing would become the luxury of the rich. The bulk of the grass grown would be absolutely wasted unless the science of the vegetarian were able to prepare from it a food for man. The productive value would be, however, increased if the grass plains were converted into arable land for the growth of cereals and sugar beets, and into orchards for fruits and nuts. We should have an insufficient and expensive supply of milk, milk products, and eggs, wool and leather. We should be dependent on cotton and linen for clothing and on compressed cellulose for boots and many other purposes."

When we turn to the physiological side

of the question, it is fair to state we find quite as much uncertainty. It has been advised that more milk and less meat be included in the diet on the ground that milk is relatively rich in vitamines and calcium.

Professor Murlin recently very properly referred to the discovery of vitamines as one of the four great concepts in nutrition. It is, however, no exaggeration to say that in some quarters too much stress has been laid on the importance of vitamines, in the adult diet at least. To quote Professor Murlin:

"A reduction of a few per cent in the capacity of a food to protect a guinea pig from scurvy or to promote the growth of a white rat, should not be accepted as proof that we are all about to die of deficiency diseases."

Walter H. Eddy in his recently published *Vitamine Manual* gives a list of ninety-four foods which contain one or all of the three known vitamines. With these food elements so widely distributed, there does not seem to be any danger of a deficiency in the average diet.

The British Medical Research Committee seems to have taken a rational view of the vitamine question. Its report states:

"These accessory factors or vitamines are widely distributed among naturally occurring foodstuffs, and in time of peace, under normal conditions of food supply, the variety of food consumed by European nations protects them from risk of any deficiency in these essential substances."

The same is undoubtedly true of this country. Very much the same principle applies to advice to consume more milk because of its calcium content. There is no evidence of a lack of calcium in the average diet, at least not in the diet of adults. Primitive man evidently managed to get his calcium and so do the Esquimos and the carnivorous animals to-day. There is no doubt but that the value of more milk in the diet is not fully appreciated, but the increase should not be at the expense of other valuable foods. We should all aim towards the education of the public to the best suited and best balanced diet, including all the essential elements.

A very interesting, instructive and important example of misapplication of the vitamine hypothesis was furnished recently by a bill introduced in Congress to prohibit the manufacture of a class of foods known as "Filled Milk" and which are admittedly wholesome and nutritious. Those favoring the bill did so on the ground that these foods are composed of skimmed milk and vegetable fat, usually cocoanut oil, and are deficient in vitamines and, therefore, might become injurious to health and might lead people to believe that they were buying milk even though the labels on the containers plainly stated what the ingredients were.

A number of excellent authorities appeared before the committee and discussed the bill from all angles. Lafayette B. Mendel furnished the committee with a written opinion which we believe is very rational and we, therefore, quote it in part:

"Preparations of so-called 'Filled' Milk are emulsions of vegetable fats in skimmed milk. Cocoanut oil is commonly used, I believe, in preparing them. These fats are admittedly digestible and nutritious; so is skimmed milk, which, owing to fostered prejudices, has been a greatly undervalued article of diet. The milk compounds should be properly labeled, as every package of food should be. They should not be recommended for use in infant feeding; on the other hand, no harm can come from the chance use of a quantity of skimmed milk even by infants. I mention this because the opponents have spread the impression among gullible persons that the use of a can of milk compound is a positive menace to the infant which consumes it. Skimmed milk is not a rank poison. It is merely not a complete food for an infant. Neither is barley water nor prepared foods.

"I am informed that some of the milk compound packages and advertisements not only give the composition of the contents, but specifically indicate in words that the

product is not recommended for infant feeding. What, then, shall we say of the value of the milk compounds, properly marketed in conformity to the pure food laws for adult nutrition? I do not see how they can be designated otherwise than as wholesome food. Indeed it would be a nutritional advantage if skimmed milk were used more widely in culinary practices. It greatly enhances the value of cereals, notably the 'staff of life,' bread. 'Filled' milk enriches them also, adding wholesome fats. No one knows at present to what extent 'Vitamine' may be required by adults, but in any event the latter, using a mixed diet of adult life, are not dependent upon cream for this food factor. It is quite as reasonable to object to the sale of polished rice or patent flour; indeed, skimmed milk and its 'compounds' surpass either of these foods in nutritious properties. The opponents of 'filled' milks have tried to exclude them on the plea of 'menace to public health.' No public-health question is involved. The claim is a specious one. The House bill represents a fight between industrial interests and I am confident that the medical profession would not admit that any wholesome food is a menace. Life and health are not endangered."

To paraphrase a famous saying, "Vitamine, what crimes are committed in your name!" More has been written about vitamines recently than about any other phase of food and nutrition. As was probably to be expected with a subject as new as the vitamine theory, not all the literature is based on scientific research or study. Unfortunately, in addition to the great wealth of truly epoch-making work that has been reported, the public has in many instances been served gross misinformation, intentional or otherwise. Perhaps the best example of this is the statement made in a book on food recently that "water and air are very rich in vitamine."

The patent medicine man and the "cure-all" manufacturer were not slow in taking advantage of the vitamine theory and the great publicity it has received the past few years. The public has been literally flooded with preparations in the shape of foods, drugs and confections that are supposed to be chockful of vitamines and will cure almost any human ill, as well as preserve youth and enhance beauty.

It has even been stated that cancer may be due to a lack of vitamines; hence in order to prevent and cure cancer, eat this or that vitamine food. At first glance these substances seem harmless enough and quite unworthy of serious consideration, but their numbers and the extravagant claims made for them constitute a potential source for positive harm. Like all "cure-all" remedies, they may do a great deal of harm by inducing the sick to rely on them rather than seek competent medical advice and so delay proper treatment for their afflictions until a cure is no longer possible. Even in the case of the well, they are injurious when they induce people to rely on foods or drugs, patent or otherwise, to the exclusion of other essential foods.

The whole matter seems of sufficient importance to merit the attention of this Section, or possibly the Association as a whole, to the extent of arranging and publishing a statement of the present knowledge of vitamines, their possibilities and limitations, and their proper place in the diet and in medicine.

Such a statement would carry as much weight of authority as the "standard methods" series issued by the Association, and would accomplish a great deal towards stabilizing and disseminating the truth about vitamines, in so far as it is known to-day.

WILLIAM H. LIPMAN,
Chairman.

F. C. BLANCK
ANNA A. CHAPIN
ALFRED W. LOMBARD
T. D. BURDETTE.

REPORT OF THE COMMITTEE ON NUTRITIONAL PROBLEMS (DRIED MILKS)

Read before the Food and Drugs Section of the American Public Health Association at the Fiftieth Annual Meeting, New York City, November 15, 1921, and adopted by vote of the Section.

IN accordance with a resolution passed at the last annual meeting of the Association, the Committee on Nutritional Problems devotes its report this year to the subject of dried milks, with special reference to the possible development of the dried milk industry as a means of increasing, conserving and marketing the milk supply.

Economy of time and space makes it necessary for us to present the results of our study of this subject in somewhat categorical form with little of introduction or discussion. The points which seem to us especially worthy of emphasis at the present time and from the standpoint of the resolution referred to, are as follows:

(1) Examination of statistics of food supply and data of dietary studies recording the food habits of hundreds of presumably representative American families, and the comparison of such data with the results both of clinical experience and laboratory experiments upon human beings as well as lower animals lead unmistakably to the conclusion that the highest degree of health and vigor can be expected only from dietaries or food supplies which are richer in milk than is the present average food supply of the American people. In the interest of the public health the American milk supply should not only be fully maintained; it should be increased more rapidly than the growth of population so that we may have an increased per capita consumption of milk in its various forms.

(2) To increase the milk supplies of cities and towns by bringing fresh milk from greater distances must necessarily tend to increase the cost. It is probable, too, that any very great intensification of milk production within the present market milk areas would also tend to increase the cost, especially in view of the seasonal factors which affect both the supply of, and the demand for, market milk.

(3) In order that the seasonal surplus of milk produced in the present market milk areas may be conserved for human consumption, and that as it becomes necessary milk may be brought economically from greater distances, it seems both inevitable and desirable that the preservation of milk by condensing, evaporating or drying should be much more fully developed, and that such preserved forms of milk (either as such or after being "remade" to the composition of fresh milk) shall play an increasingly important rôle in the food supply of the future.

In this connection we may quote the opinion of Dr. Lucius P. Brown that the introduction of milk-drying plants will constitute a large and highly important factor in the development of the dairy industry in our southern states in the very near future.

(4) In view of the recent development of new methods of studying food values through feeding experiments with laboratory animals, it would seem well worth while, if funds could be found, to institute a thorough investigation of the relative nutritive values (from all standpoints) of condensed, evaporated and dried milks. In the absence of the detailed information which can only be obtained by such investigation we shall not here attempt any comparison of these three forms of preserved milk, but will consider only the question of dried milk and dried milk products as referred to us at the last annual meeting of the Association.

Probably the three most important points to be considered are: (a) the sanitary aspects of the milk-drying industry, (b) the nutritive value of dried milk and

its products, (c) the possible effects of a dry milk industry upon the dairy industry and milk supply as a whole.

(5) The cleanliness of a dry milk product will obviously depend in large measure upon the cleanliness of the milk which was dried; and sanitary conditions in the factory and the details of method employed will largely influence the opportunities for recontamination of the dry product during handling and packing. Milk-drying establishments should naturally be subject to the same inspection as other food factories with reference to the sanitary aspects both of the materials and the methods which they employ. On the other hand, the ordinary processes of commercial drying are more efficient even than pasteurization in destroying the bacteria originally present in the milk, and the product is no longer in danger of secondary decompositions and is no more subject to secondary contamination than any other dried food. Dried milk may be considered, for practical purposes, as free from danger of the transmission of epidemic disease, except under the rarest and most exceptional circumstances, and its general use should mark a distinct gain from the standpoint of sanitation.

(6) The nutritive value of dry milk and its products has been the subject of extended study and report under the auspices of the Local Government Board of Great Britain and has likewise been treated in several publications of the United States Public Health Service. Some of us have been privileged also to see a report upon the use of dried milks as human food prepared by Dr. E. V. McCollum for the International Health Commission, and have been connected with laboratory investigations in which dried milks have constituted the chief part of experimental diets.

The evidence which has come to us from these different sources is quite consistent, and plainly places dried milk with pasteurized milk as regards the various factors of food value. In both cases the only significant change which occurs as the result of the heat treatment with its attendant manipulations, if properly conducted, is a diminution of the antiscorbutic vitamin. This has already been recognized as a possible result of pasteurization and it is now a generally accepted practice to give orange juice or some other suitable antiscorbutic to all infants artificially fed on any other than fresh *raw* milk. The orange or tomato juice thus given primarily as an antiscorbutic is undoubtedly beneficial in other aspects of nutrition as well, and with this addition to the diet it becomes unnecessary to debate further as to the extent to which the antiscorbutic vitamin present in the milk is diminished in the drying process or whether there is greater destruction when the drying is accomplished by one mechanical process than by another. The original vitamin content of the milk, its freshness when dried, and the manner in which the drying process and the subsequent handling of the product is conducted are all factors of possibly equal importance with the mechanical principle on which the drying process is based. It is important also to remember that the processes for drying milk are still undergoing development and modification. In our opinion, it would be a mistake to prejudice the development of the industry at this early stage by any expression of preference as between the different drying processes, based merely upon consideration of the antiscorbutic vitamin. We think it much better to recommend that an antiscorbutic be given in all cases in which dependence is placed upon either pasteurized or dried milk by whatever process prepared. In fact, in view of the dependence of the antiscorbutic value of milk upon the diet of the cow (or of the mother), it may be advisable that all children receive an antiscorbutic.

Aside from the question of antiscorbutic vitamin, which easily can, and in our opinion always should, be provided from other sources, we believe that milk dried by any of the modern methods

properly conducted is the equivalent of the fresh milk from which it was prepared.

The British report above referred to states explicitly "that cow's milk, during the process of desiccation, loses none of the characters which are necessary for the support of normal growth in infants." The United States Public Health Service also reports highly favorable results from the use of dry milk products in infant feeding. McCollum records most excellent results from the addition of dried milk as sole milk supply to the dietary of an institutional group of children, and many experiments could be cited in which dried milk as a sole food has supported good health and normal growth in the rat for periods much longer than would correspond to infancy and early childhood in the human subject.

We believe there is ample evidence to support the position taken by the Commission on Milk Standards that there is no occasion for prejudice or discrimination against dried milk as compared with pasteurized milk even as concerns the most delicate factors of nutritive value.

(7) Since the best standards of nutrition and health require not only the conservation of our present milk supply but its increase, in order that the per capita consumption of milk may grow with the knowledge of the food value of milk and its proper place in the diet, it is important that the drying of milk be considered also from the standpoint of the effect of this industry upon the dairy industry and milk supply as a whole.

In his paper on "Remade Milk and Cream," presented at a special conference of the International Association of Dairy and Milk Inspectors in April, 1919, Redfield summarizes as follows the claims made for remade milk and cream:

1. They are very valuable for making up the shortages which normally occur in the fall of the year and are much cheaper than "accommodation" milk and cream.

2. There is a great saving in transportation with regard to labor, car space and refrigeration when milk powder and butter are shipped instead of liquid milk.

3. Powder and butter preserve milk in the condition it was in on leaving the cow and prevent the undesirable and very possibly deleterious changes which occur during the holding and shipping of liquid milk.

4. Cities not surrounded by a dairy section or cities in a hot climate can be provided with as good a milk supply as cities more favorably located.

5. The price of milk and cream would be stabilized because powder and butter could be put away in the time of plenty and held without appreciable deterioration until the time of shortage.

6. Waste is prevented and the food supply is conserved because each distributer can make just what he needs each day and will never have an excess to spoil on his hands (or to be made into butter and cheese at a money loss because he has paid market milk prices and transportation charges on his raw material for butter and cheese and so cannot compete with the country creamery).

7. A much more uniform body and flavor can be obtained in cultured milks if remade skim milk is used than if natural skim is employed. The claim is made that there is, moreover, a shortage at all seasons of the year, in cities, of natural skim milk which is acceptable in quality for making cultured milks.

At the annual convention of the same association in December, 1919, G. B. Taylor, market milk specialist of the Dairy Division, United States Department of Agriculture, discussed the "Effect of Remade Milk on the Dairy Industry," basing his report upon letters received from heads of dairy departments in the state agricultural colleges to whom he had written asking for an expression of opinion. The great majority of these heads of dairy departments reported their belief that the powdered milk industry will be a benefit to the dairy industry and

to agriculture in general, as stated in the following reasons:

a. It will help stabilize the market for dairy products.
b. It will help solve the problem of surplus milk.
c. It will increase the use of milk generally, especially in countries where, on account of climatic conditions, the use of milk has been restricted.
d. It will not compete directly with the market milk industry, but will be used principally for cooking, for bakeries and confectioneries.
e. The manufacture of skim milk powder would be an advantage to dairymen since the prices realized by them in supplying milk for this product are very satisfactory.
f. The more uses milk is put to, the better it is for the dairy farmers.

The opinion is widely held and in our judgment well founded, that the dry milk industry will not seriously compete with or in any way injure the fluid milk industry as it now exists, but, rather, will supplement it and make possible the good use of its seasonal surplus; that with increasing recognition by consumers of the great importance of milk as food for adults as well as for children, dried milk will come to be largely used in cookery without diminishing the consumption of milk in fluid form; that the drying of milk both as a means of preservation and of greatly reducing transportation costs will permit the extension of the milk industry into regions too distant from large markets to ship milk in fluid form; that because of this extension of the source of supply, the greater consumption of milk in its different forms should not necessarily result in higher prices; that the drying of milk will greatly facilitate the production and handling of milk in the South where lack of natural ice so greatly hampers the fluid milk industry and where an increased use of milk in the diet is so urgently needed and will doubtless do more than anything else toward the lowering of the infant death-rate and the suppression of pellagra among adults.

H. C. SHERMAN,
Chairman.
C.-E. A. WINSLOW,
E. L. FISK,
I. GREENWALD.

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SIMPLICITY IN PREPARATION OF BLANKS AND FORMS

CHARLES H. LERRIGO, M.D.
State Registrar, State Board of Health, Topeka, Kansas

Read before the Vital Statistics Section, American Public Health Association, at the Fiftieth Annual Meeting, New York City, November 17, 1921

ONE of the duties of state registrars under the Model Law is to prepare, print and supply to all registrars all blanks and forms.

Blanks and forms are the confining channels through which flows the stream of vital statistics. Lacking their controlling direction, a surging mass of data would be hurled upon us such as would shame Niagara's flood in volume and be about as easily harnessed. By insistence upon the use of uniform blanks and forms, our data come to us in such a way that they are reasonably subject to classification.

But blanks and forms are only of value as they facilitate the gathering of information with reasonable accuracy. It is,

therefore, of extreme importance that three parties at interest be considered in their preparation: (1) the one who is to originate the data; (2) the agent through whom the collection is to be made; (3) the ultimate consumer.

1. The party of the first part is first in our consideration in more ways than one. He must fully comprehend the blank that we ask him to fill. He does not know, and many never will know, just why we ask for all of this information, but at the very least it must be called for in such a way that he hears the call in plain English.

2. The second party must know the whys and wherefores of our blanks and they should be carefully explained to him.

3. The third party is the one for whom most of these data are gathered. When they are delivered to him they should be dependable so that he may not misinterpret them. It is more worth while to get a few definite, dependable facts, than to gather large quantities of unintelligible fiction.

I think we shall all agree that in the preparation of blanks and forms for purposes of gathering vital statistics, the supremely important matter lies in reaching the understanding of the individual who is to fill out the blank and securing his cheerful coöperation. In this brief paper, therefore, I shall direct most of my observations to that end.

Our blanks may be roughly considered under two heads: (a) those current in all registration states, such as the standard certificates; (b) those formulated by registrars to meet their local needs.

Since the standard certificates represent the expenditure of so much time and exhaustive study on the part of our experts, there is not very much to say about them. Our disposition is to adopt them wholesale and pass them on to our local registrars for general distribution. This is a correct attitude in the main. Yet we must bear in mind when we decide upon uniform blanks, that we are not a uniform people. Our country, catholic as it is, covers a vast stretch of territory and unites many states. It is easy to conceive that there may be some peculiarity about certain of the people dwelling in one particular state that will make them place an unusual construction upon some of the provisions of a uniform blank. Its form may have to be changed to suit their comprehension.

I hold in my hand a copy of the revised Standard Certificate of Birth, a document that may well be considered to be the last word in standard blanks (at least for ten years). Yet I find that a large percentage of the doctors and midwives of the state of Kansas do not fully comprehend all of its sections, especially that enumerated as item 20. I agree that the questions of that item are clear enough to many of us. But "the proof of the pudding is in the eating." As I examine the certificates coming in from doctors and midwives, I have ample ocular evidence that it is not clear to them. Item 20a asks, "Born alive and now living?" They reply, "Yes," or they say "4 A. M.," or they even say in some cases, "Fine baby," but only those who read the whole section carefully reply by giving the number of children of this mother who have been born alive and are now living.

Of course, you will rise in just anger and say, "Call the blockheads to time. Make them read the certificate." Granting that your position is absolutely correct, still I do not feel inclined to persist in the job longer than is necessary. My point takes me back to the original statement that there will always be the possibility that the person called upon to fill out these blanks may be one who is of small intellect and little learning, and that it is my business to present to such a person blanks and forms couched in the very simplest language. In Kansas we are, therefore, settling the question by making it so plain that the dullest mind must comprehend. In our new blanks we are printing the words, "Num-

ber of children," to preface each of the divisions a, b, and c, of item 20, so that the item 20a will read, "Number of children born alive and now living," and this, I think, will be sufficiently pointed to be perfectly clear to those who read only in words of one syllable.

My object in using this as an illustration is to point to the fact that even standard forms may need to be brought into conformity with local requirements, and to stress the fact that the controlling factor is not so much whether the blank is clear to your own trained intelligence, as whether it gets accurate returns from those who are to fill it.

I think that a registrar has but one way to satisfy himself that all of his blanks and forms are producing satisfactory returns, and that is by personal inspection. My state has supplied its local registrars for many years with books in which to keep their local record of births. Each book contains a dozen sheets of a printed blank that serves to maintain a very serviceable local record of births. It is, on the whole, an admirable form. I do not know where we got it, but my guess is that we copied it from some older eastern state which, in turn, had copied its blank from one of the old countries. Under the general heading, "Date of birth," it has three ruled columns in the following order: "Day," "Month," "Year." It was not until I made an extended trip examining the books of the local registrars that I discovered anything wrong with that blank. Then I found that every new registrar had infinite trouble getting used to writing in the order named. The common order of writing a date in our country is not 18th November, 1921. It is November 18, 1921. When we prepare our blanks these things should have our consideration. Our registrars are not trained clerks. It is foolish to try to inflict upon them old styles that do not prevail in their own community. It is our business to make records easy for them to keep. A personal check of some of our returns might disclose some of the points that are giving difficulty.

The blanks must follow along the lines of least mental resistance of the masses. We may argue that the masses are not right, but it is a poor argument. Our mission is to get certain data for use in vital matters, and to get those data as accurately as possible. In gathering them, we must use the forms of expression that the people understand.

In our local forms prepared for our own use, we find simplicity of prime importance also. In my state we have long since ceased to send any certificates back for completion or correction. Writing letters about every deficiency is too costly. We experimented with many blanks and found the simplest the best. We simply reproduced the items of the certificate on a printed blank and prefaced this with a line to the effect that the certificate named required completion or correction as to items checked in red. This direct and simple statement brings as near one hundred per cent of satisfactory responses as can be hoped for.

Not only should all blanks and forms be as simple as possible, but they should also be stripped of every unnecessary item, and a great effort should be given to make allowance for sufficient space on each line without crowding. While this is true of every part of the record, it is especially true where proper names are to be written. Names are of all lengths. They must often be written by those who have no clerkly skill. Such a person may write with reasonable legibility if sufficient space is allowed in the blank, but let him try to crowd his letters into a limited space and he gives you little but a confused blur of cryptographic symbols. Here again I am urging the importance of giving especial recognition to the limitations of the untrained and inexperienced.

On the whole, I am content to make this the one point of this paper—prepare

your blanks in such a way that they shall be adapted to the *minimum* intelligence of your constituency. Make them as simple as possible. Make them legible. Put them in words of one syllable. Adapt them to local needs. Make them so that "he who runs may read," and also write. If you present them so poorly that the important records sought are rendered inaccurately, the failure lies with you rather than with the individual of eleven or twelve years' mental age upon whom the burden was placed of attempting to fit data that he did not appreciate into a form that he did not comprehend.

□

A SIMPLE METHOD FOR ANAEROBIC CULTIVATION IN PETRI DISHES

STERNE MORSE, M.D., and NICHOLAS KOPELOFF, Ph.D.
Serologist and Bacteriologist, Psychiatric Institute, Ward's Island, New York City

Read before the Laboratory Section of the American Public Health Association, at the Fiftieth Annual Meeting, New York City, November 15, 1921

ALL the methods so far proposed for anaërobic plate cultures labor under at least one of the following difficulties: 1. Require special apparatus. 2. Are messy and time consuming. 3. Do not give sufficiently high limits of anaërobiosis. 4. Colonies are difficult of access.

The method to be described is a modification of the technic employed by us in studies on the atmospheric requirements of bacteria.[1]

Simple as it is, we have found no description of it in the literature and therefore venture to present it in the hope that it may prove of some value to other investigators dealing with anaërobic microörganisms. The procedure consists in taking two tops or two bottoms of ordinary Petri dishes (sterile) and placing them edge to edge as shown below in Fig. 1. (We prefer to use dishes 15 mm. deep.)

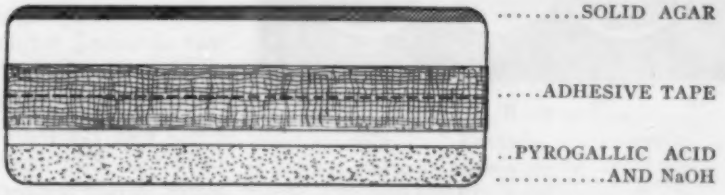


FIG. 1. PETRI DISHES ARRANGED FOR ANAEROBIC CULTIVATION

Obviously, uniformity in the diameter of the dishes is desirable. When making large numbers of cultures in this way, it is advisable to sterilize a number of Petri dishes in the usual way. Then pair off the tops and bottoms immediately before pouring the medium. The culture or medium is poured into the lower Petri dish. After it solidifies, it may be streaked in the usual manner. The paired dishes are then turned upside down and about 5 to 10 gm. of dry, powdered pyrogallic acid is placed in the lower half. About 30 c.c. of a 5 per cent solution of sodium hydroxide is then quickly poured over the pyrogallic acid. Immediately a strip of surgeon's adhesive plaster is placed around the equator uniting the halves. The "capsule," as we call it, is then incubated and treated with no more

respect than an ordinary aërobic plate. It is evident that such plates make it easy to count numbers of anaërobes, and simplify the purification of anaërobic cultures, streaking exudates, etc.

That the conditions are anaërobic is proved by the growth of the more common anaërobes and by success in culture of *B. Tetanus* and *B. Putrificus,* strains of which were kindly furnished by Dr. C. Krumwiede and Mr. G. F. Reddish, and which were said to be the most sensitive to oxygen of any cultures in their collection. It will be seen that in Figure 2, *B. Tetanus* has been streaked and there is good growth along the streak as well as differentiated single colonies well adapted for fishing. In Figure 3, the growth of *B. Putrificus* has radiated out from a small lump of egg meat medium which has been transferred from the original culture in the plate at the right, and has grown well along the streak in the plate at the left. Cultures may be kept under anaërobic conditions in this way for a long period of time, by simply varnishing the adhesive plaster.

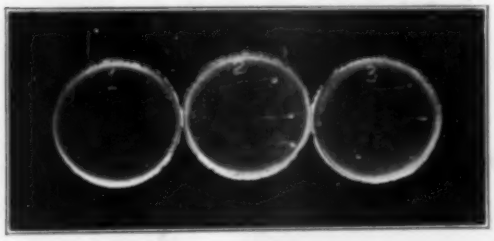


FIG. 2. B. TETANUS

Legend

1. 20 *gm. pyrogallic acid*
2. 10 *gm. pyrogallic acid*
3. 5 *gm. pyrogallic acid*

Note: Glass etched on plate No. 2

FIG. 3. B. PUTRIFICUS

The test of power to reduce methylene blue as an indicator of anaërobiosis recommended by Gates[2] and others was also carried out successfully. 0.5 c.c. of a 1 per cent aqueous solution of methylene blue is added to 10 c.c. of 2 per cent dextrose agar (PH 7.8) the medium becomes completely decolorized in the "capsule." Upon opening the "capsule" and permitting the introduction of oxygen, the blue color returns, only to disappear when anaërobiosis is reëstablished. This is supposed to be one of the most delicate criteria for the determination of anaërobiosis, as indeed it is.

Upon culturing *B. Tetanus* for the first time, no growth was obtained by this method. The culture seemed above reproach and the only plausible explanation was to the effect that the presence of methylene blue had an inhibiting influence on the germination of the spores, and the reproduction of the vegetative forms. On repeating the test and omitting the methylene blue, no growth appeared. It was noticed, however, that the agar in these tests seemed to be very dry. Thereupon the test was repeated, using three different amounts of pyrogallic acid, namely, 5, 10 and 20 gm., respectively. *B Tetanus* then grew very nicely, but in inverse ratio to the amount used. See Fig. 2. In other words, with small amounts of pyrogallic acid good growth was obtained, while with a large amount no growth was visible. Evidently, the strong dehydrating effect of the pyrogallic acid was responsible for the earlier failures. The agar medium has a high water vapor tension, while the pyrogallic acid solution has a very low water vapor tension due to its high degree of concentration. We were led to a consideration of this important factor by virtue of the previous studies dealing with water vapor tension. Consequently in working towards an equilibrium the agar yields its moisture to the pyrogallic acid solution which is of lower water vapor tension.

As a means of lessening this difference in water vapor tensions, 2 per cent gly-

cerine was added to the agar medium. Glycerine, as we have shown,[1] is a strong dehydrating agent. The good growth of *B. Tetanus* finally obtained, therefore, has a particular significance.*

1. Nicholas Kopeloff and Sterne Morse. Studies on atmospheric moisture requirements of bacteria. I. Water vapor tension. Proceedings of Society for Experimental Biology and Medicine, 1921, 308-310.

2. Gates, F. L. and Olitsky, P. K. Factors influencing anaërobiosis with special reference to use of fresh tissue. The Journal of Experimental Medicine, 33, 1921, 51-68.

SUMMARY

The method described for the anaërobic cultivation of bacteria in Petri dishes is:

1. Simple.
2. Inexpensive.
3. Efficient in establishing anaërobiosis.
4. Easy to manipulate.
5. Uses stock apparatus.

*We wish to thank Mr. E. J. Kennedy for his assistance.

REPORT OF THE COMMITTEE ON BATHING PLACES

Read before the Sanitary Engineering Section of the American Public Health Association at the Fiftieth Annual Meeting, New York City, November 17, 1921, and adopted by vote of the Section.

THE Committee on Bathing Places presents herewith its third progress report. At the San Francisco meeting a discussion of our second report indicated the desire of the members present that this Committee obtain definite information as to the methods employed at different bathing places for washing and disinfecting suits and towels, and also, that an investigation be made to determine the extent and prevalence of infections which may be conveyed by means of swimming pools and other bathing places.

An endeavor has been made to obtain definite information along both of these lines during the past year. While the Committee has obtained much valuable information concerning the methods employed in handling suits and towels, this information is as yet not sufficiently complete for presentation in this report.

We have attempted to obtain information as to the extent and prevalence of diseases which may be conveyed by means of bathing places from a large number of physicians whom we believed might be in a position to furnish information of value. To this end a questionnaire was prepared in which the following questions were asked:

1. Do you consider public bathing places (swimming pools, beaches, etc.) an important factor in the transmission of diseases?

2. If so, what diseases?

3. State briefly circumstances regarding any particular cases of disease with which you have been connected, which you feel reasonably certain were contracted at a bathing place.

   a. From the water.

   b. From the suits and towels.

4. Do you consider the method and care of laundering bathing-suits and towels of greater or less importance than the quality of swimming pool water, in so far as disease transmission is concerned?

5. Do you consider that the possibility of drowning or injury due to falls or collision at a swimming pool is of greater or less importance than the transmission of infection?

6. Following is a list of infections sometimes claimed to be readily transmissible by swimming pool water or bathing suits. State briefly your opinion as to the importance or non-importance of these diseases in the consideration of sanitation of bathing places.

   Typhoid fever
   Gonococcus infection
   Syphilis
   Ringworm
   Dysentery
   Colds
   Pink Eye
   Boils

In all about 2,000 copies of this questionnaire were sent out by the several members of the Committee. Owing to a slight misunderstanding among the dif-

ferent members as to the procedure to be followed, there was some difference in the list of persons in the different states to whom this questionnaire was addressed. In the eleven states north and east of Washington, D. C., the questionnaire was sent to all physicians specializing in ear, eye, nose, throat and skin diseases; in the other states it was addressed to all eye, ear, nose and throat specialists and health officers. Owing to the slight discrepancy in the list of persons from whom questionnaires were obtained in different parts of the country, the results are perhaps not strictly comparable. It is the intention of the Committee to send out additional questionnaires to the health officers and skin disease specialists who were omitted in the first canvass, and in a later report to submit a full detailed tabulation of the information obtained from the various sources.

A total of 627 replies to our questionnaires had been received from 41 states and the territory of Hawaii up to the time this report was prepared. In a number of instances physicians stated that they did not feel competent to express an opinion on any of the points enumerated. Furthermore, many physicians answered certain questions, but stated frankly that their experience did not qualify them to answer the remaining questions. In all, 571 replies were received in which one or more of our questions were definitely answered. Because of the large and complicated mass of information received the Committee has not yet, in the limited time available, been able to thoroughly classify and tabulate it. We feel, however, that the information already obtained is of such great importance that we present a preliminary summarization of the replies as follows:

In reply to our question 1, enumerated above, 550 opinions were expressed. Of these, 384, or 70 per cent, were to the effect that bathing places were an important factor; 143, or 26 per cent, were to the effect that they were not important; while 23, or 4 per cent, of the physicians were in doubt.

In reply to our question 4, 500 opinions were expressed. Of these, 190, or 38 per cent, considered the quality of water the most important consideration; 156, or 31.2 per cent, considered the sanitation of suits and towels was more important; and 154, or 30.8 per cent, were to the effect that both were of equal importance.

In reply to our question 5, 439 opinions were received. Of these 283, or 65 per cent, considered danger of infection the most important consideration; 114, or 26 per cent, considered danger of drowning or accident more important; and 42, or 9 per cent, considered both were of equal importance.

In question 6 the physicians were asked to express an opinion on the importance or non-importance of bathing places as means of transmitting certain diseases frequently attributed to them. The tabulated results of expressed opinions are shown in the following table:

	Number of definite opinions expressed	Number expressing no opinion	Number of physicians expressing definite opinions as to importance of bathing places.			
			Important		Not important	
			Number	Per cent*	Number	Per cent*
Typhoid	277	301	153	55	124	45
Gonococcus	293	285	155	53	138	47
Syphilis	278	300	116	42	162	58
Ringworm	256	322	152	59	104	41
Dysentery	240	338	113	47	127	53
Colds	318	260	223	67	95	33
Pink eye	324	254	249	77	75	23
Boils	291	287	181	62	110	38

*Represents percentage of number of definite opinions expressed.

Our question 2 asked what diseases the physician considered might be transmitted, and in question 3 he was asked to report cases of different diseases he had observed in his practice which had been definitely traced or might be attributed to water, or suits, or towels at a bathing place. The answers to this question have brought out a surprising amount of information, which is shown in detail in the following table:

	No. of physicians who consider disease important	No. of physicians reporting cases observed
Eye Infections		
Non-specified and miscellaneous	26	9
Pink eye	249	73
Conjunctivitis	136	77
Opthalmia	3	3
Pneumococcus infections	3	2
Trachoma	14	5
Ear Infections		
Non-specified and miscellaneous	50	37
Otititis Media	145	129
Mastoiditis	27	19
Meningitis	5	5
Otomycosis	1	1
Nasal Infections		
Non-specified and miscellaneous	31	15
Colds	223	35
Coryza	6	3
Rhinitis	25	24
Sinus infections	72	71
Ethmoiditis	1	1
Throat Infections		
Non-specified and miscellaneous	15	8
Tonsilitis	21	13
Bronchitis	5	3
Pharyngitis	7	6
Laryngitis	4	3
Skin Infections		
Non-specified and miscellaneous	36	9
Boils	182	25
Furunculosis	42	32
Impetigo contagiosa	27	19
Molluscum contagiosum	4	4
Dermatitis venenata	3	1
Fungoid infections	4	2
Eczema	9	9
Scabies (Itch)	18	11
Ringworm	153	24
Pediculosis	6	5
Venereal Diseases		
Gonococcus infections including eyes	155	31
Syphilis	116	11
Gastro-Intestinal Diseases		
Non-specified and miscellaneous	3	1
Typhoid and paratyphoid	155	18
Dysentery	113	7
Miscellaneous Diseases		
Influenza	5	2
Tuberculosis	6	6
Lobar pneumonia, articular	1	
Rheumatism, pyorrhoea	1	
Alveolarus, pituriasis	1	

The most significant and important information obtained from our replies has been reports of epidemics of various diseases which, from the information supplied by the reporting physicians, may be considered reasonably authentic. Seven different physicians report epidemics of conjunctivitis, and 6 others epidemics of skin diseases, 4 of these being epidemics of furunculosis, 2 of impetigo contagiosa, 2 of molluscum contagiosum and 1 of eczema. Two physicians reported epidemics of middle ear infection which, from the history submitted, were undoubtedly attributed to infection of the water at the bathing places. Two other physicians reported epidemics of tonsilitis and pharyngitis, and one reported an epidemic of nasal sinus infection in which all evidence points to bathing water as the origin. One of the members of the Committee also reports an epidemic of typhoid fever in a camp for boys which was unquestionably traced to bathing in polluted water.

It is very seldom that fatal cases of any disease outside of typhoid, perhaps, have been attributed to bathing place infection. One physician, however, reports a fatal case of mastoid infection and 4 other physicians report a number of fatal cases of meningitis following infections of the nose or ear passages.

The list of diseases reported above include a number for which there are at present no methods for detection in water. It seems to your Committee that such methods are greatly needed, in order that the occurrence of the causative agents of these diseases may be detected in water and the effectiveness or non-effectiveness of our methods of sanitary control demonstrated. We would, therefore, respectfully recommend that the question of devising such methods be referred to the Laboratory Section for consideration.

GEORGE W. SIMONS, JR.,
Chairman.
RALPH HILSCHER.
HARRY F. FERGUSON.
STEPHEN DE M. GAGE.

CORRELATION OF STREAM POLLUTION CRITERIA FROM STUDIES OF THE NAUGATUCK AND HOCKANUM RIVERS IN CONNECTICUT

J. FREDERICK JACKSON

Director, Bureau of Sanitary Engineering, State Department of Health, Hartford, Connecticut

Read before the Sanitary Engineering Section of the American Public Health Association at the Fiftieth Annual Meeting, New York City, November 17, 1921

INVESTIGATIONS of stream pollution have quite generally proceeded from complaints of nuisance either on account of their physical appearance or the odors arising from them. In determining the degree of pollution, the oxygen and bacteria in the river have come to be quite generally accepted as the best indices of pollution and the permissible pollution has been expressed in terms of sewage-contributing population as related to stream flow.

In the investigations on the Naugatuck and Hockanum Rivers, certain inconsistencies were encountered in getting satisfactory results from these criteria, and this paper discusses:

1. Physical condition of rivers as shown by the correlation of observed odors and unsightliness, with results of chemical and bacteriological surveys.

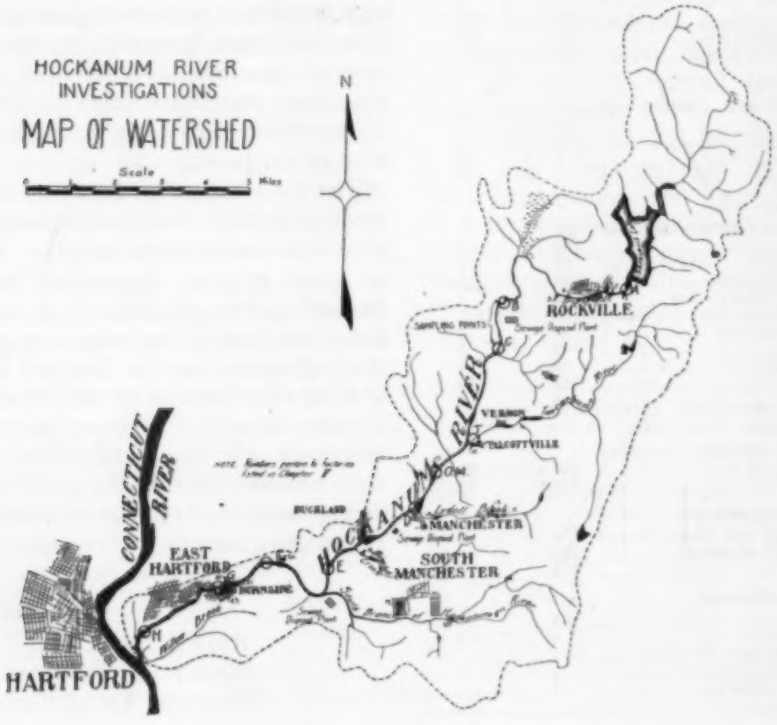
2. Inhibitory effect of industrial wastes on the bacterial content of rivers.

3. Limitations of determinations for dissolved oxygen and dissolved oxygen demand as criteria of pollution.

4. Limitations in application of stream flow in second feet per 1,000 contributing population.

DESCRIPTION OF RIVERS

The Naugatuck River, starting at Torrington, is formed by several small streams which have their sources in the hills of Norfolk and Winchester. From



Torrington to Derby, where it flows into the Housatonic River is a distance of 39.6 miles, and between these cities the river falls about 528 feet. This fall is broken by numerous dams built by factories which have located on its banks. From Derby to Waterville the valley is densely populated, the towns merge into each other, there is no marked break in density of population and pollution is quite noticeable. From Waterville to Thomaston and Thomaston to Torrington the density is less and the buildings and visible signs of pollution not so numerous. All of the towns are industrial in character, and about 143,000 people and 125 factories are contributing pollution in noticeable amounts above the mouth of the river at Derby. The critical points of pollution are below Torrington, Waterbury, Naugatuck and Ansonia.

The brass industry predominates but there are a number of large iron works, several rubber factories and a few textile mills. The estimated volume of wastes in gallons per 24 hours is as follows:

TABLE I

	Above Waterbury	At Waterbury	Below Waterbury	Total
Industrial	9,863,000	43,314,000	19,905,000	73,082,000
Domestic	3,700,000	20,000,000	6,675,000	30,375,000

The Hockanum has its source in Schenipsit Lake in the northwest part of Tolland and flows southwest about 27 miles, entering the Connecticut at East Hartford. The total fall is 575 feet and, like the Naugatuck, it is broken by numerous dams. The principal towns are Rockville, Manchester and East Hartford.

South Manchester, a model industrial town located on the South Branch, contributes wastes from a large silk mill, several paper mills, and the sanitary sewage of the entire town. Textile, silk and paper are the principal industries. The total estimated volume of wastes in gallons per 24 hours from all the towns is:

Industrial	Domestic	Total
8,000,000	1,740,000	9,740,000

The total contributing population is 42,000 and the number of factories contributing pollution approximately 25.

Both of these streams act as main drainage outlets to highly developed industrial communities. On the Hockanum some efforts have been made to relieve the pollution by building treatment works at the main sources of pollution but because of inefficient operation, lack of capacity and neglect, all have ceased for some time to be of any material benefit. On the Naugatuck some experimental

work has been done, but none of the towns have actually built any disposal works. The evidence of physical pollution is much more pronounced on the Naugatuck than on the Hockanum, and the correlation between observed conditions and results of chemical and bacterial analyses more definite.

SUSPENDED SOLIDS AND APPEARANCE

The index of physical pollution of the rivers as shown by the appearance correlated with turbidity is the amount of suspended solids.

Of the seventeen stations on the Naugatuck the correlation showed eight stations to be satisfactory, two of them being very good and six in fair condition; nine stations were unsatisfactory, two being doubtful and the remainder bad. The summary of the results from the summer averages was:

TABLE II

SUSPENDED SOLIDS

	Appearance Satisfactory					
	Clean			Fair		
	Max.	Min.	Mean	Max.	Min.	Mean
Naugatuck	7	4	6	13	5	10

	Appearance Unsatisfactory					
	Doubtful			Bad		
	Max.	Min.	Mean	Max.	Min.	Mean
Naugatuck	24	14	19	43	11	21

Of the ten stations on the Hockanum, three were satisfactory, five doubtful and two unsatisfactory. The summary, using in this instance the total solids and omitting one station where the dilution undoubtedly affected the results, was:

TABLE III

TOTAL SOLIDS IN HOCKANUM RIVER

Satisfactory Clean			Doubtful			Unsatisfactory Bad		
Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean
95	48	69	164	104	139	171	148	159

In correlating the visual pollution of a stream with the results of the analyses, judgment must be exercised in applying the criteria for suspended solids; we must discriminate between a river discolored by dye wastes or clay carried in suspension and one carrying solids, such as feces, toilet paper and sewage fungus. Further, the putrescible matter might be in a finely divided state, in which case the appearance would be unobjectionable and we would have to depend on other results of the analyses.

The results of the summer averages on the Naugatuck River showed a definite classification and the correlation was clean cut, the average for satisfactory stations being 6 p. p. m. and for unsatisfactory 18 p. p. m., the division between the two classes coming between these two. When we consider the many factors which may affect the results, particularly the great amount of sedimentation in mill ponds, the feasibility of applying the criteria of suspended matter to a river as affecting its appearance is questionable. This determination, has, however, considerable value when estimating the amount of dilution required to make the condition of the river inoffensive.

ODORS

When we endeavor to correlate the results of the chemical and bacteriological survey with odors as noted from observation we get some very interesting developments. With slight variation all of the 17 stations on the Naugatuck excepting one fall into two classes, 4 satisfactory—no odors, and 12 unsatisfactory—odors. The results for the several determinations using in each case the summer averages were:

TABLE IV

SUSPENDED SOLIDS P. P. M.

	Satisfactory (No Odors)			Unsatisfactory (Odors Observed)		
	Max.	Min.	Mean	Max.	Min.	Mean
Naugatuck	7	4	6	43	11	18

TABLE V

DISSOLVED OXYGEN

PER CENT SATURATION

	Satisfactory (No Odors)			Unsatisfactory (Odors Observed)		
	Max.	Min.	Mean	Max.	Min.	Mean
Naugatuck	101	88	96	71	50	63
Hockanum	96	87	91	52	29	40

TABLE VI

DISSOLVED OXYGEN DEMAND

P. P. M OXYGEN SAMPLES

INCUBATED AT 20° C. FOR 48 HRS.

	Satisfactory (No Odors)			Unsatisfactory (Odors Observed)		
	Max.	Min.	Mean	Max.	Min.	Mean
Naugatuck	4.1	2.6	3.6	5.2	2.7	3.9
Hockanum	2.1	1.2	1.7	4.2	2.7	3.6

INHIBITING EFFECT OF CERTAIN WASTES

In sewages, the proportion of acid forming bacteria to total bacteria growing at body temperature is quite high, often being as much as 50 per cent. Consequently, where sewage is discharged into streams affording low dilution, we would expect the proportion of acid formers to total bacteria to be quite high. This, however, was not the case for either

the Naugatuck or Hockanum Rivers, the proportion being exceedingly low, indicating selective germicidal action by certain wastes. Also below the points of maximum sewage discharge we would naturally expect very high total counts. Actually, however, at most points on the Naugatuck and Hockanum Rivers, considering existing conditions, the counts were abnormally low. This, too, would indicate the presence of germicidal wastes.

TABLE VII

YEARLY AVERAGE TOTAL BACTERIA
B. Coli PER C.C.

Naugatuck			Hockanum		
	Total Bacteria	*B. Coli*	Total Bacteria Agar 20°—48 hrs.	*B. Coli*	
Station 2	123,000	289	877,000	17,600	Station C
Station 7	116,000	113	246,000	7,400	Station E
Station 8	302,000	164	150,000	2,200	Station F
Station 10	677,000	148	197,000	2,500	Station G
Station 16	479,000	121	102,000	396	Station H

The inhibiting effect of acids and copper salts has been noted in other investigations, particularly during the experiments on the New Haven sewage. In this connection the results on these rivers are quite interesting.

On the Naugatuck River, above Station 2, copper bearing wastes from the several factories in Torrington, as well as the entire domestic sewage of the town are discharged into the river. Both total counts and *B. Coli* were much lower than would be expected. Station 8 on the Naugatuck River, below the Waterbury outfall sewer, while showing an increase over the previous station, is still abnormally low when the amount of sanitary sewage contributed between the two stations is taken into account. This is rather surprising because the Mad River with its heavy pollution and also the Waterbury principal trunk sewer enter the Naugatuck between Stations 7 and 8. Evidently the sewage pollution between these two stations was either not concentrated to such an extent as to markedly affect the bacteria, or germicidal action of industrial wastes was quite pronounced. The latter would appear to be more probable considering the many factories contributing germicidal wastes at Waterbury.

At Station 10 on the Naugatuck, where the copper wastes from Waterbury had settled out, total count and *B. Coli* increased greatly. This continued at the stations down the river until Station 16, below Ansonia, was reached. Here the effect of the brass mills was shown in the decrease of total bacteria and *B. Coli*, particularly during low flows when the concentration of these wastes was greatest. These same general effects were also noted on the Mad River, which was almost always acid and where 7.8 parts per million of copper were found in November, 1919.

The inhibiting action of germicidal wastes on the Hockanum was, perhaps, not quite as pronounced as on the Naugatuck. Above Station C, the effluent from the treatment works for the Rockville sewage enters the river. This effluent, however, is but little better than the raw sewage which contains wool scouring, dyeing and gas house wastes in addition to the domestic sewage of the town. At times at this station as high as 4,000,000 total bacteria and 100,000 *B. Coli* per c. c. were recorded. Apparently the wastes did not affect the bacteria materially at this point. In a general way, this station may be compared with Station 2 on the Naugatuck, as each is below the first city contributing pollution to the rivers. It is interesting to note that though the population of Torrington is about 22,000, while that of Rockville is only 9,000, the bacterial counts for Station C were many times greater than for Station 2.

Station F on the Hockanum is just below the entrance of the South Branch which receives the pollution from a large silk mill and several paper mills. In spite of this it shows a reduction in bacteria from the previous station. Other determinations, such as organic nitrogen, free ammonia and oxygen consumed indicating pollution, are noticeably greater at Station F than Station E, and the lower bacterial counts at Station F might be due to the germicidal action of dye liquors from the silk mill.

The decrease in bacteria from Station G to H may possibly be due to dilution from tidal action of the Connecticut River.

These results would indicate that copper bearing wastes and possibly compounds of zinc do have some germicidal effect upon the oxidizing bacteria and

that the dyes, mordants, metallic salts and bleaching powders used in textile and paper industries have a similar influence. This apparently affects the biochemic reactions, particularly the dissolved oxygen and dissolved oxygen demand.

When the flow of the river is low and the concentration of wastes greatest, the effect, particularly at the points of discharge, is beneficial. When these wastes have had an opportunity to settle out, bacteria and biochemic reactions act as usual and offensive conditions are created.

LIMITATIONS OF DISSOLVED OXYGEN AND DISSOLVED OXYGEN DEMAND CRITERIA

The dissolved oxygen and dissolved oxygen demand have generally been considered the best indices of the pollution of a stream. Results of these determinations on these two rivers in particular, would appear to upset this assumption.

TABLE VIII

YEARLY AVERAGES

Naugatuck			Hockanum		
	D.O.	D.O.D.*	D.O.	D.O.D.*	
Station 2	79%	72%	62%	63%	Station C
Station 7	78	54	88	35	Station E
Station 8	76	65	70	68	Station F
Station 1	96	31	92	18	Station A

*Dissolved oxygen demand here expressed as percentage of dissolved oxygen in water.

Station 1 on the Naugatuck receives only slight pollution and Station A at the dam on Lake Schenipsit on the Hockanum is practically unpolluted. At Station 1 dissolved oxygen was almost always at saturation point and the algae and microscopic plants were characteristic of clean streams. During July and August, 1918, the dissolved oxygen demand was over 50 per cent. At Station A the dissolved oxygen was usually high and dissolved oxygen demand correspondingly low.

Station 2 is one-half a mile below Torrington sewer outfall on the Naugatuck, and Station C is below Rockville on the Hockanum. At Station 2 the Naugatuck River is sluggish and deposits of organic wastes considerable. The lowest dissolved oxygen was in July, 1918, 1.8 p. p. m. or 22 per cent, whereas in March 1919, it was 13.4 p. p. m. 7°C. or 110 per cent. During the summer it ran from 300 per cent to 800 per cent on individual samples. At Station C the Hockanum river receives the effluent from the Rockville disposal plant. At the preceding Station B the initial oxygen during the summer was 8.2 p. p. m. or 92 per cent, while at Station C it was 2.7 p. p. m. or 29 per cent.

Station 8 is just below Waterbury outfall sewer on the Naugatuck and Station F on the Hockanum is below the entrance of the South Branch into which the wastes from South Manchester empty. At Station 8 the lowest dissolved oxygen was 40 per cent in August, 1918, which in spite of increased amount of sewage was only 2 per cent less than at the previous Station 7. The current at this station is swift, and large boulders in the bed of the river cause ripples which afford some reaëration. Odors were not particularly noticeable at this point and the dissolved oxygen demand varied from 5 per cent to 300 per cent, during periods of low flow averaging 100 per cent. At Station F odors were quite prevalent. The dissolved oxygen was very much reduced from the previous station in both summer and yearly averages while the dissolved oxygen demand showed little change in summer but considerable increase in winter.

These variations in the dissolved oxygen and dissolved oxygen demand determinations are attributed to the effect of the industrial wastes on the decomposition of organic matter. The wastes act as germicides and reduce the number of bacteria which has a direct effect on the organic matter and oxygen present. The putrefaction processes at the point of discharge are retarded, the loss of oxygen is decreased, and consequently odors are less noticeable and the condition of the stream improved. On the other hand, high dissolved oxygen was found in the Naugatuck River, where the conditions were so offensive as to lead one to expect quite the contrary.

The antiseptic effect of the wastes was most marked at the point of discharge. Where conditions were favorable they settled out quickly or were carried by the stream in a colloidal or suspended form as shown by the results at Station 10. At this station the large increase in the bacterial count agreed much better with the

observed condition of the river than did the chemical results. The alkalinity undoubtedly had some influence. We know that, in general, oxidizing agents act more powerfully in the presence of acids and since the germicidal properties are in part due to the oxidizing power, we would expect greater oxidation with an acid water than with an alkaline one. This is partly confirmed by the results on the Mad River which was usually found to be acid and the dissolved oxygen much higher than would be expected from observed conditions. The effect of the volume of water flowing in the river was noticeable, particularly on the Mad River and below Ansonia and Derby. Low flows evidently tend to concentrate the wastes and affect the results and this was shown in the analyses for the summer months.

LIMITATIONS CRITERIA STREAM FLOW

In applying the criteria of flow in second feet per 1,000 sewage-contributing population, the fact is often lost sight of that what we are actually seeking is the reduction of the polluting constituents of wastes to an amount which the volumes of water will take care of without creating offensive conditions. We have, in fact, been fixing limits of permissible amounts of polluting constituents but expressing them in terms of stream flow. In this connection it is just as desirable that the chemical and bacteriological analyses should extend over a long period as it is that the stream flow records should. Indeed, it is perhaps more so because, while some estimate of the variations in flow could be made from records of similar watersheds, comparison of rivers used for disposal of wastes by cities and towns of similar domestic and industrial character would not give a reliable estimate of amount and character of the pollution.

In fixing any figures for stream flow per 1,000 population and resulting dilution, the variation in the composition of the sewage is important. The composition of sewage is affected by habits of the contributing population and nature of the industries in which they are engaged. Evidently the sewage from large industrial centers of Europe is much stronger than that from the manufacturing cities of New England, because the per capita consumption of water is much less. But the consumption per capita is not nearly as uniform in New England cities as it is abroad, and this introduces another factor of uncertainty when attempting comparisons. This is clearly shown when we compare the sewage from the Naugatuck Valley with average of other American manufacturing cities in the following table:

TABLE IX

COMPARISON OF NAUGATUCK VALLEY SEWAGE WITH AVERAGE SEWAGE FROM AMERICAN MANUFACTURING CITIES

	Average Naugatuck Sewage p. p. m.	Average Sewage From American Manufacuring Cities, p. p. m.
Total Organic Nitrogen	10.5	24.1
Suspended Solids	91.0	450.
Free NH_3	11.4	26.5

The main polluting constituents are all very much less in the former than in the latter. The consumption of water in the Naugatuck Valley for both domestic and industrial purposes is about 300 gallons per capita, and these differences can undoubtedly be largely attributed to this. There are, however, other agencies which affect the composition of sewage, particularly from industrial centers, such as the acidity or alkalinity of the wastes and degree of purification, if any, which they undergo. It is also difficult to determine to what extent self purification eliminates contributing population, and for any one point on the stream what part of the population on its contributing watershed should be excluded.

For example, upon the Naugatuck the effect of sewage-contributing population of Torrington and above, 22,000, disappears almost entirely at Station 3, which is 5 miles below the sewer outfall. It, therefore, should not be included in considering stream flow required at Station 8. Above Station 8 the population of Thomaston, Waterbury, Waterville and Watertown is 101,000 and the population between Thomaston and Station 3 is 4,000. This relatively small percentage of the total population would affect the results at Station 8 only slightly whether it was included or excluded.

On the stretch from Rimmons Pond to Station 8 the contributing population is 16,600. What proportion of this and of the population of Waterbury, Waterville

and Watertown should be included? What allowance should be made for several ponds which afford opportunity for settlement for the antiseptic wastes which affect the purification, assisting it in some cases and retarding it in others? Some of the industrial wastes contain large amounts of polluting organic matter, still others scarcely any, and manifestly the whole volume of industrial wastes should not be included. The number of factors and their varying effects on the condition of the river complicate the problem exceedingly and we get widely varying results, depending on what assumptions we start with.

The following table shows the average flows and flow for the low six months of the river at Derby, where it joins the Housatonic and below Waterbury and Torrington:

TABLE X

FLOWS OF NAUGATUCK RIVER

		Derby	Waterbury	Torrington
Average	Maximum	835 Sec. Ft.	555	148
Average	Minimum	347 " "	230	62
Average	Mean	545 " "	362	97
Low Six	Months	130 " "	82	22

In Table XI is shown the total volume of wastes and the proportion of industrial and domestic wastes for the entire stretch between Derby and Torrington and also for the stretches between Derby and Waterbury, and Waterbury and Torrington.

TABLE XI

VOLUME OF WASTES

	Derby to Torrington. Gals. per 24 hrs.	Derby to Waterbury. Gals. per 24 hrs.
Industrial Wastes	73,082,000	63,219,000
Domestic Wastes	30,375,000	26,675,000
Total Wastes	103,457,000	89,894,000

From these tables the dilution factors in the next tables are derived:

TABLE XII

DILUTION RATIO BELOW WATERBURY

Flow	Waterbury to Watertown Industrial	Domestic	Combined
Maximum	6.7:1	15.1:1	4.7:1
Minimum	2.8:1	6.3:1	1.9:1
Mean	4.4:1	9.9:1	3.0:1

Flow	Waterbury to Torrington Industrial	Domestic	Combined
Maximum	8.3:1	17.9:1	5.7:1
Minimum	3.42:1	7.4:1	2.4:1
Mean	5.4:1	11.7:1	3.7:1

TABLE XIII

DILUTION RATIO BELOW DERBY

Flow	Derby to Torrington Industrial	Domestic	Combined
Maximum	7.4:1	17.7:1	5.2:1
Minimum	3.1:1	7.4:1	2.2:1
Mean	4.8:1	11.6:1	3.4:1

Flow	Derby to Waterbury Industrial	Domestic	Combined
Maximum	8.5:1	20.4:1	6.0:1
Minimum	3.56:1	8.5:1	2.5:1
Mean	5.6:1	13.3:1	3.9:1

TABLE XIV

DILUTION RATIO BELOW TORRINGTON

Flow	Industrial	Domestic	Combined
Maximum	10.6:1	25.8:1	7.5:1
Minimum	4.4:1	10.8:1	3.2:1
Mean	7.0:1	16.9:1	4.9:1

In the above tables the highly polluting industrial wastes are included with the domestic sewage, while the wastes noted as industrial are not of a seriously polluting nature and include waste waters used for boiler purposes as well as in manufacturing. The question of what wastes to include when calculating the dilution ratios is a very important one. If we include the industrial wastes as sewage, we find that for the entire river the mean average flow affords a dilution of only 3.4 to 1. If we exclude the industrial wastes the dilution is 11.6 to 1. Considering only the stretch of river from Waterbury to the mouth, the ratios are 3.9 to 1 if we include the industrial, and 13.3 to 1 if we exclude it. These examples show quite clearly the confusion which arises when it is attempted to apply the criteria for dilution and stream flow indiscriminately.

Throughout the entire period of the investigation it was noted that conditions at Station 4 just below the entrance of Lead Mine Brook, both from observation and analytical results, were quite generally satisfactory. If the polluting ingredients at the critical points of the river lower down could be reduced to the same amounts for yearly and summer averages as were obtained at Station 4, it is probable that all cause for objection would disappear. What volume of water would accomplish this? How does the dilution factor thus obtained agree with those obtained from volume of wastes? These are very pertinent when discussing criteria of stream flow per 1,000 contributing population.

Table XV gives average determinations for organic nitrogen, suspended solids and dissolved oxygen demand for Station 4 and stations below Torrington, Waterbury, Naugatuck and Ansonia. It also gives the percentage reduction required at these places to bring the above determinations to same average as obtained at Station 4. For purpose of comparison, the permissible amounts recommended by the British Royal Commission for these constituents and required reduction to bring the several stations to them are added to the table.

TABLE XV

Locations	Organic Nitrogen	Suspended Solids	Dissolved Oxygen Demand in 48 hrs.
Below Lead Mine Brook, Station 4	0.97	7.0	2.99
Royal Commission	*	25.0	4.00
Torrington	2.23	43.0	6.16
% Reduction Station 4	56.5	83.7	51.4
% Reduction Royal Com.		42.0	35.0
Waterbury	2.19	27.0	5.52
% Reduction Station 4	55.6	74.0	45.8
% Reduction Royal Com.		7.5	27.4
Naugatuck	1.45	13.0	3.92
% Reduction Station 4	33.1	46.0	23.7
% Reduction Royal Com.		0.0	0.0
Ansonia	1.25	12.0	3.53
% Reduction Station 4	22.4	41.0	15.3
% Reduction Royal Com.		0.0	0.0

*No limits recommended for this determination.

Table XVI shows the available stream flow and the flow required for the different stations.

The wide divergence in results of dilution ratios and stream flow required to reduce polluting constituents to any permissible limits is at once apparent from a study of these tables. For example, using suspended solids as a criteria it would require 23.35 second feet to effect a reduction which would make them comparable with Station 4, while at Station 16 it would only require 5.52 second feet, and the same applies to the other determinations of organic nitrogen and dissolved oxygen demand though the variation is not so great.

For the Naugatuck River it was assumed that if organic nitrogen and suspended solids did not exceed 1 and 10 p.p.m. respectively at any point, the condition of the river would be satisfactory. This would mean 3.85 second feet per 1,000 population, which is slightly more than one-half that required to bring all points to the same condition as Station 4.

Since storing the excess run-off will not afford sufficient dilution to make polluting constituents at critical points comparable with Station 4, and since the sewage from cities and factories must in any event be treated in such a manner as to keep the polluting constituents within certain limits, we felt justified in recommending this apparently low figure. On the Hockanum River 6 second feet would be required to reduce the organic nitrogen to 1 p.p.m.

Table XVII gives summer and yearly averages at satisfactory and unsatisfactory stations on the Naugatuck and Hockanum Rivers.

These results show conclusively that the stream flow second feet per 1,000 population varies with composition and distribution of the sewage and that in applying this criteria without taking these into consideration, the results are apt to be very misleading. Increase in flow from storage of excess run-off necessary to make conditions satisfactory is usually not obtainable except under very favorable conditions and then only at very high cost. For the Naugatuck River, storage and equalization of the available flow would not produce satisfactory conditions.

CONCLUSIONS

As a result of the investigations on these rivers the following are advanced as being suggestive rather than conclusive.

Because of the variations in character of the solids and form in which they are present in the stream, their correlation with the condition of the river as shown by its physical appearance is not conclusive. This may be due in part to incomplete data, and more frequent analyses supplemented by extended observations of the condition of the river at time samples were collected might modify this conclusion.

Odors as connected with determination of suspended solids did not show a definite correlation, but this, as in the case of the physical appearance, may be due to incompleteness of data.

Acid and copper salts do effect the

TABLE XVI

Stream Flow Required to Reduce Polluting Constituents to Same Amounts as at Station 4

	Contributing Population Above Station	Available Stream Flow*				Required Stream Flow			
		Second Feet	Dilution Ratio		Second Feet per 1,000 Contributing Population	Second Feet	Dilution Ratio		Second Feet per 1,000 Contributing Population
			Domestic Sewage	Combined Wastes			Domestic Sewage	Combined Wastes	
Station 2	20,900	81	13.1 to 1	4.0 to 1	3.88	—	—	—	—
Organic Nit. Standard.	—	—	—	—	—	186	30.0 to 1	9.2 to 1	8.9
Sus. Solids Standard.	—	—	—	—	—	497	73.2 to 1	24.7 to 1	23.8
Free NH3 Standard.	—	—	—	—	—	185	29.8 to 1	9.2 to 1	8.9
Station 4	21,000	154	24.8 to 1	7.3 to 1	7.35	—	—	—	—
Org. Nit. Standard	—	—	—	—	—	154	24.8 to 1	7.3 to 1	7.35
Sus. Solids Standard	—	—	—	—	—	154	24.8 to 1	7.3 to 1	7.35
Free. NH3 Standard	—	—	—	—	—	154	24.8 to 1	7.3 to 1	7.35
Station 8	104,500	313	8.4 to 1	2.6 to 1	3.00	—	—	—	—
Org. Nit. Standard	—	—	—	—	—	706	19.0 to 1	5.9 to 1	6.8
Sus. Solids Standard	—	—	—	—	—	1210	32.5 to 1	10.1 to 1	11.6
Free NH3 Standard	—	—	—	—	—	819	22.0 to 1	6.9 to 1	7.8
Station 11	117,800	378	9.2 to 1	2.7 to 1	3.21	—	—	—	—
Org. Nit. Standard	—	—	—	—	—	600	16.8 to 1	5.0 to 1	5.9
Sus. Solids Standard	—	—	—	—	—	863	21.0 to 1	6.3 to 1	7.3
Free NH3 Standard	—	—	—	—	—	815	19.9 to 1	5.9 to 1	6.9
Station 16	143,000	462	9.8 to 1	2.9 to 1	3.23	—	—	—	—
Org. Nit. Standard	—	—	—	—	—	715	15.2 to 1	4.5 to 1	5.0
Sus. Solids Standard	—	—	—	—	—	793	16.8 to 1	4.9 to 1	5.5
Free NH3 Standard	—	—	—	—	—	1110	23.5 to 1	6.9 to 1	7.8

NOTE—*Computed from U.S.G.S. gauging records during period of investigation. The available stream flow during this period was about 10% less than the average stream flow as computed by comparison with the Croton and Wigwam watersheds.

TABLE XVII

STREAM POLLUTION CRITERIA—NAUGATUCK RIVER

Determination	Summer Averages						Yearly Averages					
	Satisfactory Stations			Unsatisfactory Stations			Satisfactory Stations			Unsatisfactory Stations		
	Max.	Min.	Aver.	Max.	Min.	Aver.	Max.	Min.	Aver.	Max.	Min.	Aver.
Dissolved Oxygen % Saturation	101	88	96	71	50	63	96	91	93	90	74	79
Dissolved Oxygen Demand 48 hours at 20°C. p.p.m.	4.1	2.6	3.6	5.2	2.7	3.9	3.4	2.4	3.0	6.2	3.5	4.5
Organic Nitrogen. p.p.m.	1.24	0.59	0.99	2.90	1.52	2.05	1.14	0.51	0.83	2.23	1.25	1.66
Suspended Solids. p.p.m.	7	4	6	43	11	18	—	—	—	—	—	—

HOCKANUM RIVER

Determination	Summer Averages						Yearly Averages					
	Satisfactory Stations			Unsatisfactory Stations			Satisfactory Stations			Unsatisfactory Stations		
	Max.	Min.	Aver.	Max.	Min.	Aver.	Max.	Min.	Aver.	Max.	Min.	Aver.
Dissolved Oxygen % Saturation	96	87	91	52	29	40	99	92	94	70	62	66
Dissolved Oxygen Demand 48 hours at 20°C. p.p.m.	2.1	1.2	1.7	4.2	2.7	3.6	2.5	1.7	2.0	5.2	4.2	4.6
Organic Nitrogen. p.p.m.	.59	.43	.49	1.51	1.35	1.43	.52	.46	.49	1.33	.95	1.14
Oxygen Consumed. p.p.m.	5.3	4.5	4.9	15.4	9.5	12.4	5.5	4.8	5.1	11.2	8.0	9.6
Total Solids. p.p.m	95	48	69	171	148	159	86	47	63	122	105	113

NOTE—For the Hockanum River many of the stations are classed as "doubtful". The averages for this class are not shown in the table Correlation for other determinations not shown as results were too erratic to give reliable indications of pollution.

bacterial content of rivers and apparently the wastes from the textile, paper and silk industries and possibly certain zinc products from the brass and copper industry have an inhibiting action, though not to such an extent as the acid and copper salts. This effect may be beneficial particularly at points of discharge in a river carrying large amounts of domestic wastes. The effect is most marked when the flow of the river is low and the concentration greatest.

On these two rivers the inhibiting effect of the wastes caused such wide variations in the determinations for dissolved oxygen and dissolved oxygen demand that their use as indices of pollution was not considered feasible. In rivers where the pollution is largely from domestic wastes and the effects of sedimentation negligible, action of the oxidizing agents proceeds as usual and these two determinations correlated with the suspended solids are then of great value as indices of pollution.

The application of the criteria of stream flow in second feet per 1,000 population should not be used without carefully considering the effect of self-purification, composition of the sewage and location of outfalls. Before fixing any rate, it may be desirable to select some point on the stream where conditions are known to be unobjectionable, and from the analyses and stream flow determinations compute the dilution and flow in second feet per 1,000 necessary at other stations to make them comparable. Having done this for critical points of pollution, adjustment can be made for a general figure for the whole river which will be much more likely to be correct than if it were attempted to divide the river into sections and arbitrarily compute the relation between stream flow and the population in each section.

□

Annual Meetings of Social Science Societies.—The public health occupied a prominent place in the discussions of the annual holiday meetings of the social science associations, held in Pittsburgh, December 27-31. The societies meeting there included the American Statistical Association, American Economic Association, American Political Science Association, American Sociological Society, American Association for Labor Legislation, American Farm Economics Association, and American Association of University Professors.

One entire session of the Statistical Association program was devoted to the topic of Population and Vital Statistics. Dr. Joseph A. Hill, of the Census Bureau, discussed some results of the 1920 census, with particular reference to population. Prof. James W. Glover, of the University of Michigan, the Bureau's chief expert in constructing the United States Life Tables, described the methods employed. Edgar Sydenstricker, of the United States Public Health Service, chairman of the Vital Statistics Section of the A. P. H. A., read a paper on "Specific Death-rates from Tuberculosis in the United States," which was discussed by Dr. William C. White, director of the Pittsburgh Tuberculosis Hospital. A paper by Dr. Otto Eichel, of the New York State Department of Health, which was read by Miss Jessamine Whitney, of the National Tuberculosis Association, traced the history of pandemic influenza, identified as the same disease through recurring cycles covering many centuries.

Later in the week a joint session of the Statistical, Economic and Labor Legislation Associations was held, at which Industrial Accidents was the topic. Papers were presented on "The Present Status of Workmen's Compensation in the United States," by E. H. Downey, of the Pennsylvania Compensation Commission, and on "Statistics of Industrial Accidents," by C. H. Verrill, of the U. S. Employees Compensation Commission.

During the Statistical meetings a statistical advisory group to the Mansfield demonstration of the National Child Health Council was formed with Dr. Louis I. Dublin as chairman.

At the Sociological Society meetings Prof. Rudolph M. Binder, of New York University, read a paper on "Health and Eugenics," in which he maintained that the most practical type of eugenics is that which improves personal and public hygiene. He urged that much of our present-day education could be eliminated to advantage, and the time gained devoted to training of our boys and girls for health. (K. M. G.)

DETROIT'S EXPERIENCE WITH UNDERNOURISHED SCHOOL CHILDREN

GEORGE T. PALMER, D.P.H.
Epidemiologist, Detroit Department of Health

Read before the Vital Statistics Section, American Public Health Association, at the Fiftieth Annual Meeting, New York City, November 18, 1921

THE great war is undoubtedly responsible for renewed activity and interest in malnutrition. The disclosures of the draft board examinations, indicating the physical deficiencies of so many prospective American soldiers, has aroused this nation to the need for corrective measures. Detroit has awakened to her own problem. Last spring the city council placed in the budget of the health department twenty thousand dollars to be expended for the correction of nutritional defects in school children. The present paper is a recital of some of our experiences with this problem, together with an explanation of the program laid out for the current year.

THE NUTRITIONAL WORK OF PRIVATE AGENCIES

For some years various groups of the Federation of Women's Clubs have been serving milk and cracker lunches in the schools. For a part of last year 12,000 children in 40 of the 200 public and private schools were receiving the single milk lunch daily. This lunch, for which a charge of from one to three cents was made, was served to all or nearly all children in the schools reached, no distinction being made between the malnourished and those well nourished. This work was well received and did an immense amount of good in supplementing scanty diets, in teaching children to like milk and in acquainting the city generally with the need for nutritional education. This work was, of course, quite distinct from the open air classes for tuberculosis exposures conducted by the board of education and the department of health.

MEASURING THE RESULTS OF THE MILK LUNCH

In the early part of 1919 Mr. George A. Birkam, principal of the Barstow School decided to check the results of this work by carefully weighing two groups of children, one receiving the milk and cracker lunch twice daily and the other group receiving no supplementary feeding. Each group averaged about 11 per cent underweight. At the end of an eleven week period 90 per cent of the fed group had made better than a normal gain. In the control group only 40 per cent exceeded the normal gain. Stated somewhat differently, the fed group averaged a 25 ounce gain above the normal, while the control group averaged a loss of one ounce. The ages of these children varied from 6 to 14 years.

To observe the effect on scholarship, the children in both groups were given a ranking at the beginning and end of the period. The best pupil in scholarship was ranked one, the next best two and so on down the list. It is significant that in the fed group 54 per cent advanced their ranking, in the control group only 29 per cent advanced their ranking. This experiment was a convincing demonstration of the merits of supplementary feeding, or, should I say, sufficient food.

MEASURING THE RESULTS OF A SUBSTANTIAL HOT NOON LUNCH

In January, 1921, the Northwestern Women's Club undertook a nutritional demonstration in the Clinton and Everett Schools. In this instance the children were selected by the school medical inspectors, not because of underweight but because of visible evidences of under-

nourishment. The Clinton group averaged about 4 per cent and the Everett group about 6 per cent underweight. Both groups were visited in the home by the health department nurse and by a visiting housekeeper, with the object of interesting the parents in the nutrition of their children and of stimulating them to the correction of home deficiencies in nutrition and hygiene. Parents' meetings were also held at the school.

The Clinton group was furnished a substantial hot noon lunch in school for 13 weeks. The other group received no feeding in school. Neither group received supplementary milk lunches in school. In the fed group 69 per cent of the children made better than normal gain. In the control group only 32 per cent made better than normal gain.

It appears from this that whereas about one-third of the children can be encouraged to gain in weight by educational means alone, about two-thirds will gain if a hot noon lunch is served. The noon lunch stimulated more interest among parents. Thus 23 of the mothers in the fed group attended the meetings at the school one or more times, whereas only 7 parents of the control group came to the school meetings.

Comparing the results of 11 weeks of this noon lunch experiment with the 11 weeks of the milk lunch experiment, we note that the substantial noon lunch added 9.5 ounces more than the normal gain, whereas the milk lunch added 25 additional ounces. Furthermore, the control group with home nutritional instruction failed by 20 ounces to make the normal gain, whereas the control group without home instruction were one ounce below the normal. There were also a greater number of individual gains with the milk lunch than with the hot noon lunch.

As these groups were selected differently, one being underweight, the other visibly undernourished and only part of whom were underweight, we cannot interpret our results too freely. Of course the group receiving milk lunches was presumably getting more food in the course of the day—the lunches plus their three regular meals at home—and since the children in this group were appreciably underweight, we might expect them to respond more readily.

From an administrative standpoint the milk lunch plan is much easier to conduct, and judging from these two experiments its accomplishments are equally or even more satisfactory than the preparation of a hot noon lunch in school.

In view of the fact that no children with physical defects were excluded from these experiments, we may anticipate even better results for children who are originally free to gain.

Incidentally, we may add that the Clinton and Everett groups were kept under observation for 8 weeks after the school feeding ceased. In this time the previously fed group lost 4.3 ounces, the control group increased 1.6 ounces. Inasmuch as the home calls were continued during this later period we suspect that the falling off of both groups was due to a seasonal influence. It is entirely probable that the normal gain in weight is not the same throughout the year. In the case before us it would appear that children are much more prone to take on weight from January to April than from April to June. As the weights were taken in the nude, the question of lighter clothing in the spring is not a factor.

DETROIT CITY PROGRAM AGAINST MALNUTRITION

The fund of twenty thousand dollars appropriated by the city council for nutrition work was originally requested even in greater amount by the board of education. It was placed in the budget of the health department that it might be available to both public and private schools.

In putting this sum to work the health department is proceeding upon the assumption that the best known index of undernourishment is the relation of weight to height. Instead of dealing with those who are 7 per cent underweight as

recommended by Dr. W. R. P. Emerson of Boston, or 10 per cent underweight as recommended by Dr. Holt, we are selecting those children who are 15 per cent or more underweight. We use this standard because it gives us a group of workable size and also because the racial variations in weight are such as to reduce the significance of the 7 per cent underweight standard. In fact a United States white boy who is 7 per cent underweight might be even a trifle over weight if he were of some other nationality.

Last year the board of education weighed and measured all children in the elementary schools. Using the Wood Scale as a basis, it was found that about 20 per cent were 10 per cent or more underweight, and 6.7 per cent were 15 per cent or more underweight. This means about 10,000 Detroit children were in the 15 per cent underweight group. In September of this year all children were again weighed, and we are finding about 7.6 per cent to be 15 per cent or more underweight according to the Emerson Scale, which ignores age and recognizes merely a certain weight for each height. The extreme variations for individual schools is from 1.9 to 14.8 per cent of the total enrollment. In general the native white pupils in the more well-to-do districts are showing somewhat more underweight than those in the colored, Russian Jewish and Italian districts.

Our school medical inspectors on October 1 began the examination of the 10,000 underweight children. Those children without impairing physical defects will be immediately eligible for nutrition classes. Those with impairing defects will not be admitted until the defects are corrected. We recognize six impairing defects as follows: (1) A moderately or greatly enlarged thyroid. (2) a 20/40 vision or worse. (3) Pus discharge from ears. (4) Unmistakable evidence of mouth breathing. (5) A small size infected tonsil or any tonsil that is large enough to reach half way to the median line of the throat. (6) Ulcerated teeth. Those with other defects may enter the nutrition class. We are finding that about 53 per cent of the underweight group have one or more impairing defects.

A notice is sent to the parents of these children telling of the nutrition class and stating what defects are apparently present. Those without defects being eligible, the parents are asked to return a signed slip indicating their wish to have the child enrolled and promising on their part coöperation in the home as to ample sleep, regular meals, cool temperatures, etc., and also agreeing to pay, so far as they are able, 3 cents for each milk lunch.

The nutrition group is served milk and cracker lunches twice daily, the children coming from their rooms to a central meeting place. About 15 minutes is allowed for each lunch. No rest period follows. Once each week this class meets with the school nurse for instruction in diet and hygiene and for discussion of individual cases. Parents are expected to be present at these meetings. Every other week children are weighed and the weights plotted on individual charts.

This program is patterned after the Emerson nutrition class but varies from it in some respects. These classes are now being organized, and we are meeting with an encouraging attitude on the part of parents who wish their children enrolled. By the first of the year we hope to have from 70 to 100 nutrition classes under way. The supervision of the nutrition classes is in the hands of a trained dietician and nutrition worker.

CENTRAL COMMITTEE ON NUTRITION

The question has arisen as to the position of the private agencies now that the city has entered the field. As the amount appropriated is not sufficient to cover the entire work, we are asking the private agencies to continue their work but to confine the milk lunches to the underweight children. To make the combined work further effective, the health commissioner has appointed a central committee on nutrition, made up of representatives of the various groups interested in school feeding and also such

agencies as are interested in the professional aspects of nutrition, such as the Visiting Housekeepers' Association, the home economics department of the board of education, the Merrill-Palmer School of Motherhood and the Pediatric Society.

This committee serves as a clearing house for the exchange of ideas and prevents duplication of effort. The schools are divided among the different groups. The health department does not serve milk in a school already served by some other agency. The nurse attached to that school forms the nutrition class, however.

In this manner the nutrition work in the city is centralized, and yet each organization retains a measure of independence. Later if the city appropriation is increased to cover the entire problem, the private agencies need not be called on to supply milk, but will be asked to continue their active coöperation and personal assistance. The women's clubs have been asked to appoint a child welfare aid to every school in the city to assist the school nurse at such times as during the visits of the medical examiners, every other week when the nutrition class is weighed, and to see that some volunteer aid is present twice daily to look after the serving of the lunches. We are doing this to permit the private agencies to have first hand knowledge of school health work and to relieve the school teachers from additional burdens.

It is our hope that by means of this program we shall be doing something constructive and of lasting value, and that besides increasing the scholarship standing of these pupils we shall also be striking a direct blow at tuberculosis at its source, which plan will in time reduce the amount of this disease among young men and women in their twenties.

□

"Camp Roosevelt—Boy Builder."—The foundations of good citizenship are fostered and developed in an exemplary manner at Camp Roosevelt, that unique boy-building and citizen-making institution founded by Major F. L. Beals, U. S. A. Here the boys have an opportunity to become stronger physically, and to develop mentally and morally as well. Living out in the open, breathing fresh air, carrying on a carefully prepared program of work and play under competent instructors, the hundreds of boys who yearly attend this summer playground receive unlimited benefits.

The U. S. War Department and the Chicago Board of Education send such support to this worthy undertaking as to make the camp's opportunities financially available to boys from all parts of the country. Any healthy, wholesome, red-blooded American boy is eligible to attend. The camp headquarters are with the Chicago Board of Education, 460 South State Street, Chicago, Illinois.

Tent Inspection at Camp Roosevelt

FIRST REPORT OF THE COMMITTEE ON MUNICIPAL HEALTH DEPARTMENT PRACTICE OF THE AMERICAN PUBLIC HEALTH ASSOCIATION, NOVEMBER, 1921

This is the second installment of the First Report of the Committee on Municipal Health Department Practice, presented at the third general session, Fiftieth Annual Meeting, American Public Health Association, New York City, November 17, 1921. The first part was published in the January issue. The Committee is planning to issue supplementary reports for each main division of the activities covered.

IV. TUBERCULOSIS

1. Organization.

Eighty-one cities reporting are provided with more or less adequate facilities for carrying on tuberculosis work. In only 24 of the cities, however, has the health department a separate appropriation specifically designed for this purpose. In 13 of these cities the work is organized as an independent division and in 6 cases is headed by a full time director.

2. Reporting.

The reporting of cases of tuberculosis is still exceedingly lax. Out of 66 cities for which we have data on this point, 9 report less than one case per annual death, 28 report between one and two cases per death, 20 between 2 and 3 cases per death, and 9 more than 3 cases per death. The banner cities in this regard are Chicago, Flint, and Schenectady, with 4.1, 4.4, and 4.8 cases per death, respectively.

3. Dispensary Treatment.

Tuberculosis clinics are found in 76 cities—maintained by the health department in 38 instances, by private agencies in 24 instances, by both municipal and private agencies in 24 instances, by both municipal and private agencies in 8, and by state and county agencies in 6. In 71 cities for which we have such data, the average number of weekly sessions per clinic is 6. Evening sessions are held in 9 cities. The average number of physicians employed in tuberculosis clinic work in 62 cities studied is 1.5 per 100,000 population. The average number of nurses doing tuberculosis work is 2.7 per 100,000 population.

The average number of visits per patient per year for 50 cities is 2.8. Seventeen cities show less than 2 visits per patient per year. Eighteen cities show between 2 and 4 visits, and 15 cities more than 4 visits. The banner cities are Newark, Norfolk, Dayton, and San Diego, with 12.8, 13.2, 13.3 and 14.9, visits, respectively. The average number of visits per new patient per year in 45 cities is 6.9. Both these figures are probably somewhat low, particularly the second one, since it is possible with the systems of record keeping in use in most communities, for a patient to reappear without his previous connection with the clinic in question or some other clinic being recognized. The average cost per patient per clinic per year varies widely with the size of the clinic and the amount of follow-up work. The average cost per patient for 26 cities is $4.79, and the average cost per visit for 29 cities is $1.85.

4. Hospital and Sanatorium Treatment.

The number of beds available for tuberculosis patients for both incipient and advanced cases (in 66 cities) averages 59.5 per 100,000 population or about one bed for every 1.9 deaths in 59 cities. This figure is probably a little low as we are inclined to suspect that in some instances available sanatorium beds outside the city limits were omitted. The percentage of sanatorium beds occupied in 1920 (in a few instances in 1919) averaged 78. The admission rate to hospitals and sanatoria (41 cities) is 85.4 per 100,000 population or 76.3 per 100 annual deaths in 36 cities. The estimates reported by the health officers as to the state of the cases on admission would indicate that over 60 per cent of the cases admitted to hospitals and sanatoria are in the advanced stage and not

much over 10 per cent in the incipient stage. The average length of stay in hospitals and sanatoria is about 6½ months, and the cost per patient per day in 1920 (in a few instances in 1919) averaged somewhere between $2 and $2.50.

Sixty-five cities report some definite follow-up work of cases discharged from sanatoria and 50 cities claim to keep in touch with cases as long as they remain in the city or until they are terminated. Twenty-six cities have some provision on vocational placing.

5. Other Measures.

About one half of the cities maintain open-air schools and summer camps. Seventy-nine cities have anti-spitting ordinances, but only 12 report arrests. Thirty-two cities have a compulsory segregation ordinance and 6 report specific action taken under this ordinance.

6. Appropriations.

Twenty-four cities report a definite budgetary allotment for tuberculosis averaging 4.4 cents per capita.

V. VENEREAL DISEASE

1. Reporting.

Cases of venereal disease are reportable in all of the cities studied except Washington—in every case under state law, sometimes supplemented by local ordinance.

Cases are reported by name in 28 cities and by number only in 24 cities, while in 30 anonymity is maintained provided the patient reports regularly for treatment.

A total of 61,758 cases of syphilis and 58,074 cases of gonorrhea were reported for 1920 (in a few instances for 1919) in 62 cities, with a total population of close to 23 millions, giving incidence rates of 270 and 253 per 100,000, respectively.

2. Clinics.

Venereal disease clinics are in operation in 82 cities; Somerville alone reports no clinic. In 46 of the 82 cases the health department maintains or shares in the maintenance of the clinics. Treatment is generally free although in 18 cities a nominal charge is made where possible.

3. General Activities.

Seventeen cities report special programs in the line of combating venereal disease, aside from the provision of clinic treatment.

4. Appropriations.

Thirty-eight cities report a definite budgetary allotment for venereal disease work, averaging for the group 2.1 cents per capita.

VI. INFANT HYGIENE

1. Organization.

Infant hygiene work is carried on in all of the 83 cities studied. In 21 cities it is carried on by private agencies alone, in 15 cities by the health department or other municipal agencies alone, and in 47 cities both by private and municipal organizations.

There is a separate division of child hygiene or infant hygiene under the department of health in 32 cities,—in 15 cases with a full-time medical director, in 6 cases with a part time medical director, and in 11 cases with a nurse director.

2. Prenatal and Obstetrical Service.

Prenatal clinics are found in 67 cities. In 26 cities they are maintained by the health department, in 28 by private agencies, and in 13 there are both municipal and private clinics of this type.

Out of the 46 cities for which data were available, 13 report less than 10 per cent of the infants born as delivered in hospitals, 11 cities between 10 and 19 per cent, 10 cities between 20 and 29 per cent, 6 cities between 30 and 39 per cent, and 6 cities 40 per cent and over—the highest degree of hospitalization appearing in Springfield (49 per cent); Minneapolis (52 per cent); Spokane (64 per cent). Outpatient obstetrical service is available in 52 cities. In 20 cities it is provided by municipal agencies, in 28 by private agencies, and in 4 by both.

In a series of 61 cities, 16 cities report less than 10 per cent of births attended by midwives, 16 between 10 and 19 per cent, 13 between 20 and 29 per cent, 7 between 30 and 39 per cent, and 9, 40 per cent and over, the highest figures being estimates of 40 per cent in Wilmington, 50 per cent in Fall River and Trenton, and 80 per cent in New Orleans. Registration, either state or local, is required in 66 cities. In 43 some supervision is exercised over midwives, while in only 30 is any special training provided. In 56 cities the use of prophylactic silver solution is required.

3. Infant Welfare Stations.

Infant welfare stations are provided in 77 cities,—in 35 instances by municipal agencies, in 31 by private agencies, and in 11 by both.

In 49 cities for which data were available the total number of infants under one year under observation averaged 32.9 per 100 births. The number of annual visits per patient for 76 infant welfare stations averaged 19.6, for 60 New York City stations, 24.0.

There is on the average one infant welfare physician provided for each 689 babies registered at the infant welfare stations (52 cities), and one infant welfare nurse for each 313 infants (57 cities). The average cost of infant welfare station service for 68 welfare stations for which we have data is $4.46 per patient. The cost per visit for 67 stations averages 21 cents (60 New York stations, 19 cents). Little Mothers' leagues are organized in 26 cities.

4. Appropriations.

A specific budgetary allotment is reported for infant hygiene in 36 cities, averaging 5.7 cents per capita.

VII. MEDICAL SCHOOL INSPECTION

1. Organization.

Medical inspection of children in the public schools is carried out in all of the 83 cities under study except Dallas. It is a function of the health department in 33 cities, of the board of education in 45, while in 4 it is handled jointly by the health department and the board of education. Health department control is usual in the larger cities (58 per cent first group, 46 per cent second group); but not in the smaller cities (34 per cent, third group).

Medical inspection of children in parochial schools is carried on in 39 cities; in 34 by the health department, in 5 by the board of education.

2. Medical Staff.

In 27 cities the chief medical inspector is a full time employee; but staff medical inspectors are on a full time basis only in 12 cities. The number of pupils per full time inspector is usually about 10,000, varying from 3,000 in Pittsburgh to 19,000 in Omaha.

3. Nursing.

Five cities have no school nursing and in Cincinnati, Milwaukee, Salt Lake City and Atlanta school nursing is done on the generalized plan. In 73 cities special school nurses are employed. For the entire group of cities there is one nurse for every 4,000 pupils enrolled; in general the cities of the first group are least well provided (one nurse per 4,600 pupils). Schenectady has the amplest provision (one nurse per 1,300 pupils).

4. Nature of Examination.

Physical examination is given on admission in 51 cities. In 38 of these this is a general physical examination, in 5 an examination for the detection of communicable disease; in 8 the scope of the examination is not specified.

Examinations subsequent to entrance are given in 79 cities. In 38 of these cities the examination is stated to be a "complete" or a "general" physical examination, and made in 3 cases oftener than once a year, in 18 cases annually, in 6 cases every two years, and in 11 cases less often, usually three times during the period of school life.

5. Dentistry.

Fifty-four cities report dentists employed for school work. In 20 instances some or all of the dentists are full time employees. Dental clinics are maintained in 31 cities.

6. Results.

Records of physical examinations and defects corrected are often poorly kept and the results are not tabulated in many of the cities under observation. It is claimed, however, (data from about 30 cities) that 33 per cent of the defective teeth cases, 52 per cent of the defective eye-sight cases, 31 per cent of the defective hearing cases, 28 per cent of the diseased tonsil cases, and 42 per cent of the enlarged adenoid cases are remedied.

7. Appropriations.

A specific budgetary allotment for medical school inspection is included in the health department budget in 30 cities, averaging 8.8 cents per capita.

VIII. INDUSTRIAL HYGIENE

Industrial hygiene work is usually carried on by the state government and by industrial concerns. Industrial hygiene is an activity of the department of health in but 7 of the 83 cities in our study; and New York and Chicago are the only cities having an extensive program for industrial hygiene. The work of the other cities in this field is generally to regulate hours of labor for women and children, and to make sanitary inspections.

Inspection of industrial plants is carried out by the health department in 4 cities and 1 department (New York) maintains a clinic for industrial diseases.

In 49 cities permits are granted for children entering employment, in 26 the work being under the department of health.

IX. SPECIAL CLINICS

The data on health centers and other special clinics are voluminous and have not yet been analyzed. They will be presented in our final report.

X. PUBLIC HEALTH NURSING

1. Organization.

Public-health nursing service of some sort is available in all the cities studied and we have reasonably full data for 80 cities. In 71 of these cities some public-health nurses are employed by the health department; but in no case is such service provided by the health department alone. In 77 cities private agencies participate in this work and in many, governmental agencies other than the health department play a part.

Out of 46 cities for which we have the data, 35 cities maintain a special bureau of nursing, while in 11 the nurses are distributed in various departments.

Thirty-nine per cent of the total public-health nursing service of the 80 cities is provided by the municipal health department. In 12 cities which spend more than $.10 per capita for nursing service, the proportion of the total nursing service provided rises to 59 per cent.

2. Extent of Public-Health Nursing Service.

Grouping together all official and unofficial agencies, there is an average of 16.5 public-health nurses per 100,000 population in the 80 cities for which we have these data.

The 31 eastern cities with 18.3 nurses per 100,000 population are better provided than the 18 southern cities with 14.3, or the 9 western cities with 10.

The 14 New England cities with 26 nurses per 100,000 population are the best provided. Their superiority is due to the many private agencies which are providing public-health nurses.

One supervisor is provided on the average for every 12.5 nurses.

3. Types of Nursing.

Of the 74 cities for which we have the data, the public-health nursing service is generalized in 19 cities and specialized in 55. In the cities in which there is specialized nursing, we find 2.7 nurses per 100,000 population available for

tuberculosis work, 4.2 for school nursing, 3.1 for infant hygiene and 7.5 for general nursing service.

The nurses employed by the municipal health department may be divided approximately as follows: school nurses, 35.9 per cent; tuberculosis nurses, 18.0 per cent; infant welfare nurses, 15.2 per cent; venereal disease nurses, 3.7 per cent; others (largely for communicable disease work), 27.2 per cent.

4. Ratio of Visits per Nurse.

For 39 cities we find a ratio of 1,693 visits per year per nurse. Twenty-six cities whose health department nurses are doing specialized work report 1,618 visits, and 9 cities whose health department nurses are doing generalized work report 1,842 visits. In four cities (Dayton, Des Moines, Nashville and Kansas City, Kan.) where all the nursing forces, public and private, are combined in one organization, 2,286 visits per nurse per year are reported.

5. Appropriations.

In 38 cities it is possible to estimate the sum spent by the health department for public-health nursing; the amount averages 9.5 cents per capita.

XI. PUBLIC HEALTH LABORATORIES

1. Organization.

All of the 83 cities have facilities of some sort for public-health laboratory examinations; sixty-four cities maintain a laboratory for the examination of all types of specimens, both chemical and bacteriological; 12 cities have a bacteriological laboratory and a separate chemical laboratory under the bureau of food and drugs; while 5 cities arrange for this work by contract with private laboratories or hospitals. Among the 64 cities which maintain a central laboratory, there are 8 in which the laboratory is a small one, the bulk of the work being handled by state laboratories

Forty-one cities report a full time chief of laboratory service. Salaries for this position range from $1,500 to $6,500. The average salary is $4,016 for cities of the first group, $2,665 for cities of the second group, and $2,496 for cities of the third group.

2. Kind of Work Done.

Bacteriological examinations of water are made in 64 cities, chemical in 39; bacteriological examinations of milk are made in 71 cities, chemical in 68; examinations of food are made in 44 laboratories; of drugs in 24; examinations for diphtheria in 74; tuberculosis in 77; typhoid in 74; malaria in 37; syphilis in 48, and gonococcus in 63.

In addition to the examinations ordinarily made, pathological tissues are examined in 14 city laboratories, pneumococcus typing is done in 15, dark fields for syphilis are made in 14. The complement fixation test for gonorrhea and tuberculosis is not used in routine. Eight cities make it in special cases for gonorrhea and 1 city for tuberculosis. Virulence tests are made in 22 of the laboratories.

Research work is carried on in 29 out of 83 laboratories but it is an important part of the work of the organization in only 24, the majority of which are among the larger cities.

3. Volume of Work and Cost.

The average number of examinations (of all kinds) made in 77 cities average 86.0 per 1,000 population at an average cost of 43 cents per specimen. The average staff required for making 100,000 examinations is 8.3 bacteriologists, 2.3 chemists, and 16.1 other persons (technicians, clerks, etc.).

XII. MILK INSPECTION

1. Organization.

All but one of the cities have milk control organized under the municipal health department. In 35 cities milk control is under the division of foods, in 2 under the division of laboratories, and in 45

cities it is handled by the health officer himself or by a subordinate directly responsible to him.

The average daily consumption of milk in 68 cities is 0.66 pints per capita.

2. Inspection.

Forty-five cities employ veterinarians and inspectors; 4 employ veterinarians only and 29 inspectors only.

The difficulty of supervision at the source is illustrated by the fact that cities of the first group average 858 farms per 100,000 population supplied, those of the second group 459, and those of the third group 587. These farms receive at least semi-annual inspections in 40 cities and are scored in 55 cities, a government score card being used in 48 cities.

The average number of milk depots for 74 cities reporting is 33 per 100,000 population served. Inspections are made weekly or oftener in 39 cities.

3. Medical Examination.

Seventeen cities make a physical examination of milk handlers and 24 have a routine procedure for detecting and excluding disease carriers. The completeness with which these ends are attained is however dubious.

4. Laboratory Standards.

Samples for laboratory examination are collected weekly or oftener in transit in 13 cities, at milk depots in 22, and on delivery wagons in 24. Laboratory examinations at the farm are rare. In 72 cities an average of 154 laboratory samples of milk per month are examined per 100,000 population.

The chemical milk standards employed are usually those prescribed by the state; the requirements for solids are 12 per cent in 41 cities; for solids not fat 8.5 or higher in 66 cities, for fat, quite equally divided between 3.0, 3.25 and 3.5 in 64 cities.

A temperature as low as 50 degrees F. is required on delivery wagons in 39 cities and at milk depots in 47. Only 33 cities have this requirement for milk at farms and 30 for milk in transit.

5. Tuberculin Testing.

In 39 cities tuberculin testing is required of all herds from which raw milk is sold. Reacting cows are slaughtered in 54 cities and in 47 of these the state gives compensation.

6. Pasteurization.

Pasteurization of all milk except that from tuberculin tested herds is specifically required in 38 cities.

The holding system is required in all but 20 cities, a temperature of 145 degrees F. for 30 minutes being most common.

Recording thermometers are required in all but 18 cities.

Three-fourths of the 12 cities in the first group report 95 per cent or more of milk as pasteurized. In the second group about one-third of the cities have 95 per cent pasteurized, and in the third group only five cities. In 12 cities pasteurization plants are inspected weekly or oftener. Temperature charts are used for control of pasteurization in 16 cities.

7. Grading and Licensing.

Farms are licensed in 31 cities and dealers in 70 cities.

A grading system is in force in 30 cities but the standards vary widely in different instances.

8. Certified Milk.

Milk commissions exist in 46 cities and in 45 instances where data were available an average of 508 quarts of certified milk per 100,000 population is in daily use.

XIII. FOOD AND DRUG INSPECTION

1. Organization.

Food inspection is a function of the municipal health department in all of the cities studied; but drugs are inspected in only 36 out of 70 cities by the municipal department, being under state or federal control only in the other 24.

The chief of the food inspection staff is a whole time employee in only 29 out of 60 cities, and in one the health officer is directly in charge of food inspection. In 12 cases it is not stated whether he is a whole or part time man.

The staff usually consists of veterinarians and food inspectors. In 33 cities both veterinarians and food inspectors are employed, in 7 cities only veterinarians, and in 32 only food inspectors.

2. Control of Food Handlers.

Medical examination of food handlers is reported in 34 out of 81 cities. Thirteen cities report 500 or more such examinations in 1920.

3. Inspections of Premises.

Municipal sanitary control includes inspection of hotels in 45 cities, bakeries in 57, groceries in 51, fruitstands in 39, meat markets and slaughter houses in 61 and candy stores in 54.

4. Special Control of Drugs.

Analyses of drug samples are made in the public-health laboratories of 24 cities out of the 36 cities in which drug inspection is carried on.

Methods for the prevention of the sale of nostrums are reported in only four cities and consist of laboratory analysis, educational propaganda, ordinance and inspection.

XIV. SANITARY INSPECTION AND SANITATION

1. Organization.

Sanitatary inspection or sanitation forms a large part of the service of nearly all health departments. In 53 cities, there are bureaus of sanitation or sanitary inspection; in five other cities, there are bureaus of food and sanitary inspection. In the remaining cities, there are no organized divisions, each of the inspectors reporting directly to the health officer or other executive officer. The chiefs of bureaus of those cities having organized bureaus receive from $1,250 to $4,580, with a median salary of $2,200 per annum.

The scope of this service varies widely in different cities, including nuisance inspection in 81 of our 83 cities, communicable disease work in quarantining and fumigation in 10 cities, plumbing inspection in 18 cities, housing in 40 cities, food or dairy inspection in at least five cities, and in one city, Atlanta, street cleaning.

In 47 of the 80 cities for which we have sufficient data, and where nuisance inspection is under the health department, we find some of the personnel classified as sanitary police or sanitary inspectors with police power. Sometimes, these are members of the regular police department and are paid by the police department. In 29 cities, the sanitary inspectors have no police power.

2. Activities.

The most common activity of the sanitary division is investigation of nuisances. These inspections are largely in answer to complaints received by the department, although in 63 cities, inspections are instituted on the department's own initiative. In forty-seven cities there are annual clean-up campaigns; 71 regulate stables; 59 cities are undertaking fly control work, 41 cities mosquito control, and 16 cities rat extermination work.

Plumbing inspection consists of approval of plans for new and old plumbing, issuing permits and inspection of new and old work. Besides the 18 cities where it is a part of the bureau of sanitation, it is also under the health department as a separate bureau in 22 additional cities. In the remaining cities, it is under some other municipal department, usually the building department.

Housing inspection with special reference to ventilation, overcrowding, etc., is a health department activity in 40 cities. In ten others it is carried on under another division. No housing inspection was reported in fourteen cities; in a few it is under state commission.

Garbage collection and disposal is reported under the health department in 23 of the 79 cities reporting. In the remaining cities, it is under some other

city department. In 18 cities where the collection and disposal is under some other department, the health department had advisory control over the collection. The disposal of garbage is by feeding to hogs in 28 cities, by incineration in 21, by reduction in 17 cities, by dumping in 18 cities and not stated in 8 cities.

XV. WATER SUPPLY

1. General Statistics.

The water supply is owned by the city in 72 of the 83 cities under study, by private concerns in 9, and jointly by the city and county in one; one is not stated.

About 94 per cent of the population represented in this study use city water. In 9 only out of 70 cities reporting is less than 85 per cent of the population supplied with city water.

The average daily consumption of city water in 66 reporting cities ranges from 52 gallons per capita (in Fall River) to 259 (in Chicago). Thirty cities report 51-100 gallons; 21 cities, 101-150 gallons; 7 cities, 151-200 gallons; and 8 cities, 201-259 gallons.

In 33 cities out of 63, at least 90 per cent of the total city water supply is metered; in 8 cities, the proportion of metered water is between 71 and 90 per cent; in 3 cities between 51 and 70 per cent; in 7 cities between 26 and 50 per cent, and in 12 cities it is less than 26 per cent.

2. Source and Treatment.

Forty-three out of 80 municipal supplies are derived from rivers, 15 from lakes and 5 from combined lake and river sources. Eleven are supplied from wells and 6 cities have combination well and surface supplies.

Storage of water is specifically reported in 32 cities. Sixty-four out of 76 cities indicate the use of purification treatment other than storage. Chlorine is employed as a routine in 51 of the 76 cities reporting. In 31 cities mechanical filters are in operation, in 10 cities slow sand filtration.

3. Health Department Supervision.

Supervision of the water supply by the health department is reported in 45 cities. In 32 of these, this control includes testing of laboratory samples, in 6 inspections of the water shed. In 12 other cities there is health department supervision of a merely advisory or coöperative type. Inspection of water sheds by departments other than the health department is reported in 26 cities.

4. Laboratory Control.

Laboratories are located at the plant in 44 out of 71 cities. Bacteriological examinations are made daily or oftener in 52 cities out of 68 reporting. Chemical examinations are not so frequent. They are made daily or oftener in only 24 cities while 24 cities report them as made less often.

5. Supplementary Private Water Supplies.

Private water supplies provide a portion of the water in 43 cities in addition to the 9 cities entirely supplied from private sources. In 23 of these the supply does not exceed 1 per cent of the total water consumed.

Permits for bottled water are required in 19 out of 74 cities, issued by the city in 15 and by the state in 4 instances. In 34 cities the city health department, and in 6 cities the state health department exercises some supervision over bottled water.

XVI. SEWERAGE AND SEWAGE DISPOSAL

1. Sewerage.

In a group of 68 cities reporting as to the adequacy of sewerage, 39 cities only have 85 per cent and more of the population connected with the public sewers.

In 33 out of 76 cities reporting the combined system of sewerage is in use, in 24 cities the separate system alone; while 19 cities have both combined and separate systems.

2. Sewage Disposal.

Fifty cities discharge their sewage into rivers, 8 into lakes and 20 into the ocean.

Fifty-nine cities definitely state that the sewage is discharged untreated, 19 report the specific treatment used and for 5 cities we lack data. The 19 cities for which treatment is reported may be roughly classified as follows:

Sedimentation, septic or Imhoff tank treatment, 7 cities (in Providence followed by chlorination).

Preliminary sedimentation of some sort followed by trickling filtration, 7 cities.

Sedimentation followed by contact treatment, 2 cities.

Sedimentation followed by sand filtration, 2 cities.

Activated sludge treatment, 1 city.

The treatment plant is under technical supervision in 18 cities and there is a laboratory at the plant in 12.

Nuisance arising from sewage disposal is reported in 29 cities.

3. Privies and Cesspools.

In 83 per cent of the cities of the first group, 50 per cent of the cities of the second group and 37 per cent of the cities of the third group it is reported that not over 5 per cent of the population use privies.

Fly proofing is required in 32 cities, 3 of the first, 7 of the second and 22 of the third group, 65 cities reporting.

The board of health is responsible for cleaning privies in 51 cities, private agencies in 6, and other city departments, not specified, in the rest, 68 cities reporting.

The percentage of flush closets connected with cesspools is from 0.25 to 4 in 2 cities of the first group, from 0.5 to 15 in 4 cities of the second group and from 0 to 50 per cent in 19 cities of the third group.

4. Comfort Stations.

Comfort stations are found in 59 of the 71 cities reporting, 7 of the first, 9 of the second and 43 of the third group, the number varying from one to 24. Hot water is supplied in 28 cities and soap and towels are available in 42.

XVII. PUBLICITY AND PUBLIC HEALTH EDUCATION

1. Organization.

Health education through publicity and lectures is carried on in 75 cities.

A publicity director is in charge in 8 cities; the health officer personally directs the work in 38. In Chicago and Flint, he is assisted by an experienced newspaper man, and in five other cases by deputies, bureau heads, nurses, etc. In 22 cities there is a definite appropriation for this work.

2. Bulletins

Bulletins are published in 44 cities. In 37 they are published monthly and in 8 weekly, while 6 of these cities issue both weekly and monthly publications.

The bulletin is issued free except in New York and Toledo, where the price is nominal. It is sent principally to public-health workers, social agencies, other health departments, schools, libraries, and "leading citizens." In only 2 is it sent to industrial plants.

3. Press stories.

The newspapers are supplied with educational material in 62 cities; in 5 daily, in 13 weekly or oftener and in the rest irregularly.

4. Lectures.

Lectures are given in 50 cities by the health officer in the majority of cases. Motion pictures are used in 18 cities and stereopticon views in 21. Seven departments own a small footage of films.

Thirty-eight cities have exhibits, but only 17 report that they have used them during the period under study. Twenty-five cities have graphic displays in the department office; 24 have portable exhibits and 4 have prepared exhibits for fairs, etc.

5. Training of personnel.

Thirty cities offer facilities of some sort for training their public-health employees. Twenty-two of these have lectures or training courses within the department, 6 avail themselves of public-health training courses offered at local colleges, and three use the public-health courses offered by hospitals.

6. Expenditures.

The per capita cost for publicity and public-health education in the 22 cities which have a special appropriation for this purpose is .5 cents per capita.

XVIII. VITAL STATISTICS

1. Jurisdiction.

Where the state department of health is charged with administering the vital statistics law, the city health department is the local agent for enforcing the provisions of birth and death registration acts (67 cities). In 16 cities, located in states where the responsibility for enforcing the registration acts is placed upon the secretary of state, the city clerk is registrar.

2. Registrars and statisticians.

A full-time registrar or statistician is employed by 46 of the cities. The remainder of the 83 have part-time direction of this phase of health work. Salary data were partially reported. The highest salaries for full-time direction of vital statistics work were paid in New York City ($5,000), Chicago ($3,800), and New Orleans ($3,300).

3. Reports and Bulletins.

Weekly bulletins are issued by 22, monthly bulletins by 53, and annual reports by 45 of the cities.

4. Cost of Registration Department.

Data on cost were reported by 30 cities. In these cities the per capita cost for registration and statistical service was 2 cents, varying from a maximum of 5 cents to a minimum of .8 cents.

5. Accuracy of Certificates of Causes of Death.

In 71 of the cities, death certificates are scrutinized carefully for deficiencies in the statement of the cause of death.

6. Tabulations.

No satisfactory data on the tabulations made by individual health departments were obtained. A summary view of the weekly, monthly and annual reports shows, however, a striking lack of uniformity among the cities in table forms, details of tabulation, etc.

7. Prosecutions; completeness of reporting.

Four of the cities reported prosecutions for violation of the birth registration laws. In two cities (New York, Richmond) convictions were obtained. Only two cities reported prosecutions for violation of the death registration laws (Minneapolis, Houston). Convictions were obtained in both cities, but obviously these figures are inadequate statements of the condition of registration in these cities.

Only eight of the cities reported that they were getting less than 90 per cent of the births. Seven cities reported death registration percentages of less than 95. None of the percentages ran below 90, however.

8. Births Reported by Doctors and Midwives.

In cities having a high proportion of foreign-born population, the percentages of births reported by midwives were high, i. e., above 30 per cent; in cities with a large proportion of native-born population the percentage was small (below 10 per cent). In four cities less than 50 per cent of the births were reported by doctors (in New Orleans, only 20 per cent). Thirty-nine cities report 75 per cent or more of the births as having been certified by doctors.

EDITORIAL SECTION

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A. W. Hedrich, C.P.H., Editor — Kenneth M. Gould, M. A., Associate Editor.

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PAMPHLETEERING AND PUBLIC HEALTH

Education in hygiene and public health is one of the essentials in the proper development of our national vitality. The most popular instrument for such education seems to have been and still is by pamphleteering. That there has been something of an abundance of health pamphlets is shown by a few statistics. The eleventh edition of the list of publications of the government on health, diseases, drugs, and sanitation, which was issued by the superintendent of documents in August, 1921, contains approximately one thousand different pamphlets on these subjects. They come from nearly fifty separate government bureaus, divisions, or sections. In this catalog is listed only such material as is still available. The United States Public Health Service alone has issued about nine hundred pamphlets on various health subjects since 1896, according to its catalog of April, 1919, and 173 more have been put out in the two years following this catalog. The United States Children's Bureau has issued some ninety different pamphlets since 1912, and the Bureau of Education adds about thirty more to the ever growing list. Each of the state departments of health produce from one to fifty pamphlets. Let us say, as a conservative estimate, that there is an average of ten to a state. Thus, nearly five hundred more pamphlets join the throng. With the number which emanates from the nearly eight hundred municipalities having health departments, from the one hundred and eighty odd national agencies which deal with some phase of public health, and from the numerous state and local voluntary health agencies, whose number is legion, the total amount of health pamphleteering begins to assume gigantic proportions. It is a safe guess that there are not less than two thousand health pamphlets which have been issued within the last twenty years; it is probable that there are more.

The distribution of these various pamphlets also presents some interesting data. According to the 1921 report of the Surgeon General, the Public Health Service distributed in 1920 nearly 18,000,000 pamphlets. About half of these were on the subject of venereal diseases and were also handled by the states. In 1921 the Public Health Service distributed about 5,000,000 pamphlets, more than three-quarters of which dealt with social hygiene. The Children's Bureau has sent out nearly 9,000,000 of their pamphlets in nine years of existence, and the Bureau of Education has distributed about 500,000 of the health education series. When to these figures are added those of the Department of Agriculture, which has many health publications, the other government departments, the states, and the voluntary organizations, as well as the municipalities, the total annual distribution of health pamphlets becomes too great even to hazard a guess at the amount.

If we could assume that all of these pamphlets were assiduously read, and that they were effective, the thought arises why the general public does not show a greater use of the knowledge which should have been gleaned from these valuable publications. Perhaps some one may suggest the iconoclastic thought that there may have been some lack of quality in a few of these pamphlets, though there seems little lack of quantity. Yet, these pamphlets have undoubtedly accomplished much good; there are one hundred million people and an effort to reach all of them with instructive and inspiring health messages is worth while. But one other thought arises. How much more good might have been accomplished if the energy, effort and expense in preparing these two thousand pamphlets and in distributing them had been concentrated in producing and thoroughly distributing, say, one hundred? One hundred pamphlets in twenty years which represented the last word in scientific accuracy, popular appeal and effective propaganda! It is a thought worth keeping in mind for future consideration. J. A. T.

MOBILIZING AGAINST CANCER

The announcement by the Bureau of the Census of the mortality rates from cancer for 1920 is a warning call to action on the part of sanitary and medical science. The upward trend of the specific death-rate for cancer in the United States registration area for deaths shows no break, but rather an acceleration. The number of deaths from this cause in the area during 1920 was 72,931, and if the rest of the nation had as many deaths from this cause in proportion to the population, the total number of deaths from cancer in all states for 1920 was 89,000—5,000 more than the estimated total for 1919. The cancer death-rate in the registration area for 1920 was 83.4 per 100,000 population, as against 80.5 in 1919.

In comparing the death-rate from cancer in one state with that in another, the census rates are corrected for differences in the age and sex distribution of the population because, generally speaking, only persons in middle life and old age have cancer, so that a state with many old persons may be expected to have more deaths from cancer than a state with comparatively few old persons. The highest corrected rate for 1920 is 98 per 100,000 population for the state of Massachusetts, and the lowest is 45.9 for the state of South Carolina.

For a few states corrected rates have been calculated separately for the white

and colored population. In this group of states the highest rate for the white population is 92.5 per 100,000 for New York, and the highest rate for the colored population is 82.2 for Pennsylvania. The lowest rate for whites is in Mississippi, and the lowest rate for Negroes is 38.5 for South Carolina.

Summarized briefly, the corrected rates show that the Northern states have comparatively high cancer mortality, while that of the Southern states is comparatively low. But there is little difference between the rates of the white and colored races in the same states. In other words, both races seem about equally susceptible to cancer, but both seem less susceptible in the South than in the North.

It can scarcely be claimed that this menacing situation has come upon us unawares without intelligent effort to combat it. Since the organization, within the medical profession, in 1913, of the American Society for the Control of Cancer, there has been persistent, devoted, and far-seeing activity to learn the facts regarding cancer and to bring them home to the public. The Society has had a phenomenal development and within the past year has joined the National Health Council and put through a new plan of organization and a period of intensive popular propaganda which have gone far to give the disease the importance in the public mind which it possesses in the vital statistics. The regional and state organization under the presidency of Dr. Charles A. Powers has vastly stimulated local activity in cancer control. The results of the first national "Cancer Week," held October 30-November 5, 1921, indicate a great increase of interest in the subject, evidenced both by correspondence at the Society's headquarters, and a large increase in the number of cases uncovered and of applications to physicians for consultation and diagnosis. In November, 1921, one community reported 132 cases, as against 50 in November, 1920.

Offers of support from many sources are multiplying. For instance, the North Pacific Surgical Association appropriated a sum of money out of its treasury to be expended in aiding the work of the American Society for the Control of Cancer in the northwestern region, including Washington, Oregon, and British Columbia, and has appointed a committee to confer with the regional director of the Cancer Society as to the most advisable way to expend this money.

This is only a suggestion of the eager generosity of the organized medical and surgical profession to aid in cancer control. The health officials, federal, state, and municipal, have been no less active, and those in charge of Cancer Week were astonished at the wave of coöperation they received from the health departments. Several state boards turned over an entire issue of their bulletins or issued special publications on the subject of cancer. There was an equally marked desire to assist shown by the general press. Editors of newspapers, popular magazines, and periodicals of all kinds gave freely of their space. Moving-picture houses, churches, insurance companies, fraternal orders, women's clubs, business clubs, and civic organizations of all kinds participated.

The control of cancer, even more imperatively than most specialized health work, rests on two main legs: research and popular education. It is true that we know as yet comparatively little about the disease, and there is an urgent need for more knowledge of cancer itself—its etiology, heredity, dietetic relations, the value of various therapeutic agents in its treatment, and standardized

statistical information as to its incidence, mortality, and distribution. Valuable research in all these fields is on foot. It needs the utmost encouragement, both moral and financial. Here is a wide-open field for the scientific philanthropist, and the sanitarian should keep in constant touch with its developments.

But even more fundamental is the necessity for public enlightenment. We do not have a great fund of technical information about cancer, but we do know enough for the immediate practical purpose of prevention, which is an educational problem at bottom. Certain broad principles based on experimental evidence are known and agreed upon:

1. Cancer is a non-contagious local growth, involving certain cellular tissues.

2. It can be checked and destroyed if taken early enough, and the malignant tissue removed by surgical excision, or radioactive treatment.

3. It is essential that the patient recognize the danger symptoms—small lumps, hard spots, or persistent sores—and secure adequate diagnosis and treatment immediately.

This is all that it is really necessary to know for a campaign of prevention, and if conscientiously applied by health officials, physicians, nurses, and the plain citizen, working in cordial coöperation, a long start will have been made toward the reduction of that onward-marching death-rate. No effort to further it should be neglected.

□

ASSOCIATION NEWS

LIST OF NEW MEMBERS

Proposed for Election to the A. P. H. A. December 1 to December 31, inclusive.

Names of Sponsors are set in **Bold Face Type.**
Names of New Members are set in Light Face Type.

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Miss Olive Bolcum, Jefferson Court, Orlando, Fla. Nutrition Supervisor, U. S. P. H. S.

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Mazyck P. Ravenel, M. D., Columbia, Missouri.
Sergeant Wayne W. Willgrube, U. S. Army Base Hospital, Camp Knox, Kentucky. Senior Bacteriologist.

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Helen MacMurchy, M. D., Elgin Bldg., Ottawa, Ont. Chief of Div. of Child Welfare, Canadian Dept. of Health.

Mr. Buck, Asst. San. Eng., Saskatoon, Sask.
Mr. Albert Wright, City Hall, Prince Albert, Sask. Sanitary Inspector, Full Time.

GERMANY

Mazyck P. Ravenel, M. D., Columbia, Missouri.
Thomas J. Flynn, Major, Medical Corps., A. P. O. 927, Coblenz, Germany.

EMPLOYMENT BUREAU

HELP WANTED

Help wanted announcements will be carried free in this column until further notice. Copy goes to the printer on the 10th of each month for publication on the 20th. Mail to New York office as early as possible.

In answering keyed advertisements, please mail replies separately to editorial office in New York City. In replying give age, professional training, salary requirements, previous positions held and three or more references.

United States Civil Service Examination for Specialist in Child Hygiene.—The United States Civil Service Commission announces an open competitive examination for specialist in child hygiene. A vacancy in the Children's Bureau, Department of Labor, Washington, D. C., at $2,400 to $4,000 a year, and vacancies in positions requiring similar qualifications, at these or higher or lower salaries and expenses, will be filled from this examination.

The duties of appointees will be to plan and conduct investigations into the causes of infant, child, and maternal mortality in selected communities, rural and urban; into the methods of their prevention; into dangerous and injurious occupations; into the health of dependent, delinquent, and defective children, and other matters relating to the health of children. Appointees may also be required to investigate maternal and child welfare through the holding of conferences.

Competitors will not be required to report for written examination, but will be rated on the following subjects:

1. Education	25	weights
2. Experience	50	"
3. Publications or thesis (to be filed with application)	25	"
	100	"

An oral test will be given later to those attaining an eligible rating.

Applicants must be under fifty years of age; must have graduated from a medical school of recognized standing; and, in addition, have had at least three years' specialization in the hygiene and diseases of maternity and childhood, either in the practice of medicine, or in educational preventive work in connection with maternal, infant, and child mortality conducted by public or private agencies.

Applicants should at once apply for Form 2118, stating the title of the examination desired, to the Civil Service Commission, Washington, D. C.; the Secretary of the United States Civil Service Board, Customhouse, Boston, Mass., New York, N. Y., New Orleans, La., Honolulu, Hawaii; Post Office, Philadelphia, Pa., Atlanta, Ga., Cincinnati, O., Chicago, Ill., St. Paul, Minn., Seattle, Wash., San Francisco, Calif., Denver, Colo.; Old Customhouse, St. Louis, Mo.; Administration Building, Balboa Heights, Canal Zone; or to the Chairman of the Porto Rican Civil Service Commission, San Juan, P. R.

Applications should be properly executed, excluding the medical certificate, and must be filed with the Civil Service Commission, Washington, D. C., with the material required, prior to February 14, 1922.

The exact title of the examination, as given at the head of this announcement, should be stated in the application form.

POSITIONS WANTED

Positions wanted announcements will henceforth be carried in this column. The charge is $2 per insertion. Copy should be received at this office by the 10th of the month.

Wanted: Bacteriologist, five years in charge of bacteriological department and assistant chief chemist in a large industrial laboratory wishes position. Equipped a complete bacteriological laboratory for pathogenic disease diagnosis, blood counts, urine analysis, etc.; also water analysis for chlorine control. Considerable research work inaugurating pasteurized milk plant; all bacteriological analysis of milk in connection with an ordinance by local Board of Health. Varied experience in chemical work; best of references. Address 197, C. E. L., care this JOURNAL, New York address.

Wanted: Position as full-time health officer or epidemiologist by a physician who holds D. P. H. and other college degrees; has had much experience in government, state and municipal service; best of references. Address

200 W. N., care this JOURNAL, New York address.

Wanted: Recent graduate of well known Mid-Western college, with thorough training in bacteriology and chemistry, and a limited amount of practical laboratory experience, desires position in bacteriological laboratory. Address H. E., care of this JOURNAL, New York address.

Wanted: Position in field of child hygiene. University as well as medical graduate. Long experience in health work; two and one-half years in child hygiene; at present director Division of Child Hygiene, State Board of Health; available within next few months. Address 199, care this JOURNAL, New York address.

Wanted: Biochemist, M. I. T. graduate, 1915, at present employed as chief chemist with a large firm manufacturing biologicals and pharmaceuticals, desires to make a change. Can handle research problems relating to manufacturing processes in pharmaceuticals and biologicals. Has had considerable experience in the manufacture of antitoxins, sterile pharmaceuticals and other related products. Salary expected, $3,200-$3,500. Address G, 107, care this JOURNAL, New York address.

BOOKS AND REPORTS REVIEWED

Preventive Medicine and Hygiene. *Milton J. Rosenau, M. D., New York and London: D. Appleton & Co., Fourth Edition, 1921, Pp. 1504. Price, $10.00.*

Dr. Rosenau had vision to plan a work of this kind which would contain within a single volume an almost encyclopedic amount of information. The event has justified his viewpoint and his labor, which must have been enormous. It has been deservedly popular, so that a fourth edition has been called for in less than a decade. It easily takes first rank among text-books on this subject. It is a pleasure, but no surprise, that it is by an American, for, during the last decade or two, Americans have been outstripping all others in both the science and art of preventive medicine.

Every health officer must, and many others who are interested in human welfare and the progress of science, will desire to have at hand a book to which he can safely refer for the latest information. There is a vast amount of detail in Dr. Rosenau's book. Thus, if a person wishes to learn the best technique for smallpox vaccination, the best poison for flies, how to use cyanide for fumigation, what makes milk bitter and the definition of kata-thermometer, or the coëfficient of variability, he will find it here. Many subjects of a more general nature are discussed, such as theories of immunity, anaphylaxis, the principles of Mendelian inheritance and the relative values of public-health work, to mention only a few of the important matters treated. Most of what a health officer wants to know is in the book and, what is equally important, it can usually be easily found by the index. The material is well analyzed and arranged and the discussion proceeds in an orderly manner so that it is easy to turn to what is wanted.

No one man can be a master of the whole art of public health and hygiene and Prof. Rosenau has shown his good judgment and guaranteed accuracy by securing the aid of such men as Krause, Stiles, Carter, Howard, Winslow, Whipple and many others like them.

Among the new subjects introduced into this edition are public-health methods and measures; organization of health departments; housing; rural sanitation; public-health education; public-health nursing; drug addiction; alcoholism; undernutrition; infant mortality; vitamines; oral hygiene; ocular hygiene; personal hygiene and a laboratory course in preventive medicine and hygiene. Many other topics have been rewritten and brought up to date.

C. V. CHAPIN, M. D.

✝

Child Welfare. *Nora Milnes, B.Sc. E. P. Dutton and Co., 1921. Pp. 243. Price, $2.25.*

The author's activities as director of the Edinburgh School of Social Study have led her to regard her subject largely from the economic and social viewpoint rather than

that of public health. They have also resulted in her conceiving child welfare not as the welfare of the whole child in the mental, moral and physical aspects of his development, but merely as the securing of his physical health. She states the purpose of the child welfare movement in the following narrow terms:

"The practical aim of this movement may be separated into two branches, the first being a reduction of the infant mortality rate, and the second being to afford the child a better chance to develop into a healthy adult."

Despite the restricted point of view thus announced, Miss Milnes develops her subject in a broad-minded and interesting manner. The book contains chapters on the development of the child welfare movement in England, the preparation for the conditions of child welfare work, the economic position of the father and of the mother, the child of school age, and housing.

While the conditions pictured are, of course, English, the conclusions drawn are equally applicable to America. Speaking of the many Acts of Parliament for the benefit of the people, Miss Milnes wisely points out how ineffective they remain, unless fully explained to the ignorant, ill-developed and uneducated. "What is needed is a campaign among the people," she says; and surely her words will be echoed by every public-health worker, since popular education in health is the watchword of to-day.

CHARLES F. POWLISON.

✣

Community Responsibility. *A Review of the Cincinnati Social Unit Experiment. By Courtenay Dinwiddie. With Statistics of Health Services in the Unit District by Bennet L. Mead. New York: New York School for Social Work, 1921. Pp. 171. Price, 35c.*

This report is an impartial evaluation of the much-discussed and unique experiment in community organization which covered the years 1917-20. Much of it is taken up with the criticisms that have been made of the plan, rather than with the actual results, but an appendix on the Health Services, and a supplementary statistical statement aim to supply this deficiency.

The activities of the occupational councils, as the groups of experts organized in the district were called, dealt more largely with health problems than with any others. The services inaugurated during the experimental period included at first only the infant welfare service, but gradually were expanded to include prenatal supervision of mothers, general bedside nursing, postpartum nursing supervision of mothers, preschool examinations, tuberculosis service, and later, medical examination of adults, particularly those who had had influenza, or were suffering from venereal and other communicable diseases. The health work of the Mohawk-Brighton District was so generally supported by contributions from the community at large as to eliminate any question of charity. Further, it did not consist in the substitution of a free medical service for a previous system of paid medical service; in fact the average practice of the physicians of the district increased, owing to the preventive oversight of nurses and doctors which uncovered many cases of disease and defect which would not otherwise have come to light.

The experiment made generally recognized contributions to the development of higher standards for nursing and case work. The educational value, through the dissemination of information and interchange of opinion among the inhabitants of the district was marked. Housing conditions were improved and many nuisances eliminated. In all, some 2,000 persons, out of the 13,000 living in the district, were examined at the district health station during the period, 72 per cent of these being infants and children under five. At the peak of the work, almost 3,000 persons were carried on the various nursing services, both home and health center. Of the value of the experiment in bringing the best personal hygiene to a large number of persons, there can be little doubt. But the report gives no basis for judgment of the effects of the work upon mortality and morbidity.

K. M. G.

✣

Occupational Hazards and Diagnostic Signs.—This is a revised and enlarged edition of the Guide for Medical Examiners (Metropolitan Life Insurance Co., 1921) regarding impairments to be looked for in hazardous occupations. It is a 30-page, small size, pamphlet with a vast amount of information carefully classified.

PUBLIC HEALTH NOTES

Abstracts by D. Greene, M. D., James A. Tobey and Homer N. Calver.

High Incidence of Neurosyphilis.—The Venereal Disease Division of the U. S. Public Health Service recently addressed a communication to a few of the leading syphilographers of the country regarding the high incidence and early onset of neurosyphilis. The general opinion of the men written to is expressed as follows:

"While a certain amount of the apparent increase of neurosyphilis is due to the increasing use of spinal fluid examinations and other modern diagnostic methods, I think there is no question that the ineffective use of arsenicals plays a very important part in this most undesirable tendency. The physician or health officer who is unable or unwilling to follow a syphilitic patient through a period of years, if not for life, should not attempt to treat the disease. Relapse is certainly the great outstanding fact of syphilis and the so-called modern treatment has certainly not entirely done away with it. In particular, relapse in the nervous system and infectious involvement of the mucous membranes and genitalia are so alarmingly frequent under the inadequate use of arsphenamine that every agency which employs this drug in the treatment of syphilis should be thoroughly on the alert and equipped to detect the earliest manifestations of relapse." (Stokes.)

"It appears to us that among the factors mentioned as probable causes, two are of paramount importance, viz.: (1) the tendency to undertreat; (2) the failure to interpret pathologic findings in the light of the clinical picture. (Fraser and Duncan, *British Journal of Dermatology and Syphilis*, July, August and September, 1921.) To these we would add another of almost equal importance—the tendency to interrupt treatment by periods of rest. To our minds the treatment of all syphilis ought logically to be continuous rather than intermittent. Early neurosyphilis in the form of neurorecurrences would be reduced to nil if this were done. The most crying present need of syphilotherapy is a standard treatment, sufficiently elastic to be adapted to all types of cases, and sufficiently simple to be used by the average physician . . . unless a physician feels himself competent to carry out all the necessary procedures in the treatment of any given case, he should not attempt to treat it at all. Though many cases can be successfully dealt with by the general practitioner, he should realize that the appearance of any complicating features is sufficient to warrant the transfer of the patient to a competent syphilologist." (Keidel and Moore.)

"Syphilis of the nervous system probably begins in the first year of the infection. The number of cases corresponds roughly with the total number of cases of so-called late neurosyphilis. These statements are based on the following observations:

"(a) The number of early cases showing positive findings in the spinal fluid; (b) familial types of neurosyphilis; (c) biologic evidence of a neurotropic strain of the treponema; (d) persistence of the infection *in loco*, as in aortitis, interstitial keratitis, etc.; (e) observation of patients who developed signs of early syphilis of the nervous system and who after many years died of paresis or other late degenerations; (f) no serologic evidence as yet exists showing normal spinal fluid in the early stage and its infection at a later period.

"Early neurosyphilis may manifest itself by obtrusive symptoms, by slight objective signs or be asymptomatic. Unless they are properly and thoroughly treated these early infections may persist and cause late neurosyphilis.

"Every case of early syphilis should be treated intensively with arsphenamine and mercury given systematically in courses consisting of not less than eight injections of arsphenamine or its equivalent, neoarsphenamine or silver arsphenamine, and fifteen injections of mercury; a minimum of two courses of the former and three of the latter should be administered. The treatment should be controlled by frequent Wassermann tests and a lumbar puncture made about six months after infection or earlier if indications should exist. Complete neurological examination should be made in order to detect early involvement of the nervous system and as a control for future examinations.

"The treatment outlined is not an insurance against the occurrence of neurosyphilis which

not infrequently takes place during the active administration of the drugs. In such cases intraspinal medication administered by one familiar with the proper technic may be a necessary adjunct. It is only by controlling early neurosyphilis that we can hope to prevent the later degenerations." (John A. Fordyce.)

✣

Education in Relation to Public Health.—Education in public-health matters is greatly needed. In the United States alone ignorance of cause, prevention and cure of disease is responsible for the loss of several hundred thousand lives every year, in fact for most deaths not due to old age.

The fruits of knowledge acquired by the medical profession should, as far as possible, be accessible to the public. Tests for blood, urine and sputum, bacteriological examinations and X-ray pictures, which at best are only preliminaries to treatment, are at present financially beyond the reach of the great middle class. Adequate medical aid is at present inaccessible to others than the very wealthy or the poor who are treated without charge, partly because of very expensive apparatus used for diagnosis.

People should know the part played by bacteria in the spread of epidemics and the methods available for checking disease, and no one has a better opportunity to act as teacher than the doctor. The well trained physician who treats his patients with frankness, at the risk of personal loss, does much toward bringing about a right attitude toward the medical profession. Unless the educated class is brought to appreciate the strides already made by science, its present shortcomings and the differences of opinions of doctors will make a deeper impression than the wonderful advances made. The more educated the public becomes, the higher will be the standard of those practicing the art of healing.

Among the ignorant immigrants the death-rate is far in excess of that of the native born. This of course is partly due to their low economic status, but more to ignorance as to what course to take when illness comes to them. Sometimes this leads to home remedies, sometimes to patent medicines, but fortunately often to free clinics where something is given the patient to allay his immediate distress, though because of the great number applying he is rushed through without a careful diagnosis.

Though we no longer trust in the efficacy of amulets or medicine men, there is still much mysticism and superstition regarding medicine. One can still find traces of the old theory of demoniacal possession as a cause of disease and the practice of exorcizing the malignant spirits to effect a cure. As a scientific theory this primitive belief has advantages over some of its modern outgrowths such as the breaking out of animism.

The federal government, public schools, boards of health, and life insurance companies are all doing something to disseminate information on the preservation of health and life, but far too little.—S. J. Holmes, Ph. D., *Science*, November 25, 1921, Vol. 54, No. 1404.

✣

The Hospital Library and Service Bureau.—The first year's work of the Hospital Library and Service Bureau has been most gratifying. It has clearly demonstrated the need for such a service and the extent to which it will be used. One hundred and seventy-eight people, representing twenty-one states, three provinces of Canada, the Philippine Islands, England, Switzerland, and Belgium, have called at the library during the past year. Many of these people have come for information on more than one occasion.

Inquiries by mail have been received from thirty-five states, from Canada, South Africa, New Zealand, Malta, China, Philippine Islands, and Belgium. These inquiries have been on such a diversity of subjects and on so many sub-divisions of each subject that it is difficult to classify them.

Keeping in mind the policy of the library, which precludes the giving of advice, these inquiries were answered by information as to what was being done in other institutions. As an illustration, requests for information on rules for internes were answered by sending copies of rules in force in several hospitals, giving the inquirer an opportunity to compare the rules of different institutions before compiling his own rules.

Authors and publishers of authoritative books of interest to our clientele have responded most generously to our request for coöperation. Over seven hundred books on hospital construction, dispensaries, public health, hygiene and sanitation, social service, nursing, dietetics, child welfare, occupational therapy, and subjects of like nature, of in-

terest to hospital superintendents and their department heads, have been received.

Bibliographies on thirty-two subjects have been prepared to meet immediate needs. More than a thousand pamphlets on such subjects as hospital construction, health centers, child welfare, social service, occupational therapy, social hygiene, public-health nursing, mental hygiene, dietetics, public health and allied subjects have been received and are being classified by subject. An alphabetical index to the pamphlets has likewise been prepared.

The package libraries which have been sent out by the library have proved to be one of the most attractive and helpful features of the work. These package libraries are intended primarily for persons in rural communities who do not have access to hospital journals, libraries, and other sources of information, but a considerable number has also been furnished to hospital workers in large cities who appreciate receiving information in so convenient a form.

✣

National Health Council Issues Revised Report on U. S. Children's Bureau.—The National Health Council has issued a comprehensive report on the Children's Bureau of the United States Department of Labor. This report outlines the legal authority, history and development of the Bureau, its organization, current work, personnel, the Federal Child Labor Law, and the Act for the Promotion of the Welfare and Hygiene of Maternity and Infancy. It was originally prepared on August 1, 1921, but with the passage of the Sheppard-Towner Act, the scope and influence of the Children's Bureau has been so greatly increased and so much interest has been manifested in the Bureau, that the Council considered it worth while to revise the original report, many hundred copies of which had been distributed. The report on the Children's Bureau is one of five which have been prepared by the National Health Council concerning government bureaus dealing with public health. The others are on the Division of Vital Statistics of the U. S. Bureau of the Census, the Women's Bureau of the U. S. Department of Labor, the Division of School Hygiene of the U. S. Bureau of Education and a general report covering the health activities of the United States Government. These pamphlets may be obtained without charge from the Washington office of the National Health Council, 411 Eighteenth Street, Washington, D. C.

✣

Diphtheria Preventive Work in Schools.—1. The Schick test and the control test have been applied during the past four months to more than 52,000 school children in forty-four public schools in the Boroughs of Manhattan and the Bronx, New York City. Those who gave a positive or a positive combined reaction were injected with toxin-antitoxin.

2. The results of the Schick test in these schools show that the so-called "natural immunity" depends to a large extent on contact immunity developing after repeated exposures and mild infections with the diphtheria bacillus.

3. The children of the more well-to-do classes of our population show a much higher proportion of positive Schick reactions than do the children of the poorer classes. Relative segregation of the first, crowding and close contact of the second, probably account for these results.

4. The factors of race and hereditary family tendency also seem to influence considerably the development of natural immunity to diphtheria.

5. Negative pseudoreactions were found in some schools in fully 20 to 25 per cent of the children. These figures indicate that it is strongly advisable always to use the control test along with the Schick test in children over 5 years of age so as to identify accurately the children who show a negative pseudoreaction and thus avoid giving them the injections of toxin-antitoxin.

6. The results of the Schick retests which were made in the schools after two to five months indicate that it is better to wait at least six months before testing for the development of an active immunity after toxin-antitoxin injections.

7. Two injections of toxin-antitoxin, even of a larger amount, do not give as good results as three injections of a smaller amount. The mixture should be underneutralized and yet perfectly safe for the human being.

8. Children under 6 months should not be injected with toxin-antitoxin. They are generally immune (from 85 to 90 per cent) and do not respond to these injections, as is shown when they are Schick-tested later.

9. All children from 6 months to 5 years should be injected with toxin-antitoxin. The

omission of the Schick test is not of much consequence in this age group, as most of the children give a positive reaction. A majority of these children can be reached in the homes, in milk stations, day nurseries, children's dispensaries, infant and orphan asylums, etc.

10. To place the diphtheria preventive work in the public schools of a large city on a practical basis, it is advisable, for the present at least, to simplify it for the school physician by omitting the Schick test in the younger children and by immunizing all children of the incoming classes with toxin-antitoxin.

11. No child, however, should be pronounced as being immune to diphtheria until it gives a negative Schick reaction. The Schick test should not be made until at least six months have elapsed after the injections of toxin-antitoxin.

12. School children in the grades above the incoming classes should have the Schick test and control test made before they are injected with toxin-antitoxin.

13. Only reliable outfits for the Schick test and carefully prepared mixtures of toxin-antitoxin are of value in such preventive diphtheria work.—A. Zingher, *Jour. A. M. A.*, Sept. 10, 1921, 835. (*D. G.*)

✣

Chrysops Costata, a Blood-Sucking Fly from Cuba.—Last winter, in the cool and dry season from November till March, I was bitten in Habana repeatedly by a blood-sucking chrysops fly. Curiously enough, none of the Cuban residents knew the fly and even good observers, experts of tropical medicine and entomology, did not remember having had similar experiences.

I am informed by Dr. W. Horn, the director of the German Entomological Institute in Berlin-Dahlem, to whom I sent several specimens for determination, that the fly is the well known Chrysops costata Fabr. of Central America.

The chrysops flies are not without importance in the human pathology. I mention only the role played by the African species, Chrysops dimidiatus, in the transmission of Filaria loa. Considering the most voracious manner in which, according to my experiences, the fly sucks the blood of human beings, it does not seem impossible, that still other relations of chrysops flies to infectious diseases of man may be discovered in the future.

The experiences that I have had with this genus are the following: All my observations were made in the garden of the Las Animas Hospital in Habana. It is a large piece of land with many trees, shrubs and pasture, and a small creek runs through it, which perhaps may offer the fly the facilities for breeding places, in or near the water. Usually there are feeding on the grassland some horses, which may ordinarily furnish the necessary blood for the fly. There are also some cows and several small animals. When passing through the places where the horses usually stand, I have been bitten about a dozen times by the fly, and always on the part of the head which has the hairs. The fly has bitten me at any time of the day, at noon, when the sun was standing high, and in the morning before sunrise.

Each time I never remarked anything of the approach of the fly, but quite suddenly and unexpectedly I felt a very painful sting, as with a needle, always on some part of my head, so that I was always immediately

Chrysops Costata

induced to touch the place with my hand. The first times I crushed the fly in that way. But later I could easily catch it living, because it was so eager in sucking blood that it was not driven away by the movement of the hand. When caught it does not try to escape, but remains in a rather passive position between the fingers. Generally I found it filled with a little blood.

It seems that the fly is not very common here. Besides those specimens which I caught on my head, I scarcely remember to have seen it, either near the horses or on them.

The chrysops flies are widely distributed in the whole world in a great number of species and are easily known from the black band on the wings. Also the species called costata is well known and a detailed description does not seem necessary. It is the purpose here merely to call attention to it as sucking human blood.—W. H. Hoffman.

Am. Jour. of Trop. Med., Vol 1, No. 5, Sept., 1921.

National Health Council Meets in Washington.—The annual meeting of the National Health Council was held on January 5, at the American Red Cross Building, Washington, D. C. Dr. Livingston Farrand, President of Cornell University and former chairman of the Central Committee of the American Red Cross, was elected chairman of the Council for the year 1922. Other officers elected were Dr. Lee K. Frankel, vice-chairman; Dr. S. J. Crumbine, recording secretary, and Dr. Wm. F. Snow, treasurer. Dr. D. B. Armstrong was appointed executive officer for 1922. Other members of the staff are James A Tobey, Washington representative and Lawrence Marcus, executive assistant. Representatives and delegates at the meeting included W. Frank Persons of the American Red Cross, Dr. Lee K. Frankel of the American Public Health Association, Dr. W. F. Snow, American Social Hygiene Association; F. J. Osborne of the American Society for the Control of Cancer, Dr. S. J. Crumbine of the Conference of State and Provincial Health Authorities of North America, Dr. Victor C. Vaughan of the Council on Health and Public Instruction of the American Medical Association, Courtenay Dinwiddie of the National Child Health Council, Dr. Frankwood E. Williams of the National Committee for Mental Hygiene, Miss Elizabeth Fox of the National Organization for Public Health Nursing, Dr. C. J. Hatfield of the National Tuberculosis Association and Surgeon General H. S. Cumming of the United States Public Health Service.

✣

Public Health in the Bulletin of the League of Red Cross Societies.—The October-November, 1921, number of the *Bulletin of the League of Red Cross Societies,* Geneva, Switzerland, is more like a health magazine than anything else. At the beginning are speeches by Sir Claude Hill and Dr. Réne Sand, director-general and secretary-general, respectively, of the League, in which they outline the primary purposes of the League as the promotion of good health in every country. Then comes a message from the chairman of the Belgian Red Cross to Belgian doctors, in which he discusses the need for health work. The news of the various national Red Cross organizations which follows seems to contain mostly items concerning child welfare and public-health efforts all over the world. The general news sections contain articles on the Children's Federal Bureau of the United States, a Czecho-Slovakian Baby Week, and then a section entitled "Medical Chronicle" tells of the training of public-health nurses and social workers in Belgium, of health education in China, a health circus in Czecho-Slovakia, anti-venereal disease campaigns, mental hygiene, and child welfare in France. An abstract of Prof. Aaron Arkin's article, "The Unsolved Problems of Preventative Medicine," from THE AMERICAN JOURNAL OF PUBLIC HEALTH appears next, together with a story of the National Health Council in the United States. Other material is concerned with sex hygiene, control of tuberculosis, and health education and training. The bulletin is printed in English and also has editions in French, Italian and Spanish.—(*J. A. T.*)

✣

The Present Prevalence of Venereal Diseases.—Various observers have estimated that the amount of venereal disease in the United States ranges anywhere from 2 to 80 per cent of the entire population. In an interesting article in *Social Hygiene,* Lawrence Marcus attempts to make an estimate based on scientific analysis of the facts already at hand. He cautions us, however, against holding his figures as rigidly accurate and wishes his thesis to stand rather as a target to be aimed at by those having better or more reliable data. He reviews the figures of Vedder, who based his estimate of 20 per cent on examination of soldiers of the "old" army; the figures of Banks, whose rate of 2½ per cent was obtained by finding about 9 per cent infection in sailors and then guessing at the rate for the general population; the report of the British Royal Commission, which thinks that not less than 10 per cent are infected with syphilis and more with gonorrhea; and the figures of the surgeon-general of the army, which showed that 5.6 per cent of the second million drafted men had venereal disease. In an elaborate discussion, together with a searching examination of the sources of the figures quoted above, Mr. Marcus concludes that at present the amount of venereal disease that can be found in the United States in all persons, regardless of age or sex, is 8.12 per cent. He allows an error of 2 per cent, so that the actual percentage might be anywhere between 6.12 and 10.12 per cent. Since the 1920 census placed the population at about 104,000,000, this

would mean that approximately 8,450,000 persons in this country are infected with venereal diseases. Mr. Marcus further subdivides these figures into 6¼ per cent gonorrhea, 1¾ per cent syphilis, and ¼ per cent chancroid. Until some one with a better system of analysis or with absolutely accurate and convincing data can upset these results, the terms must stand as a reasonable and conservative estimate.—(*J. A. T.*)

✣

Committee on Salary Standards Compiling Statistics.—About three years ago, Dr. C. St. Clair Drake, Secretary of the Conference of State and Provincial Health Authorities of North America, collected and published financial statistics of the state departments of health. The data on salaries which was included in these statistics allowed comparisons to be made between the various states and is said to have resulted in necessary salary increases in a number of instances. Since it is the belief of many public-health workers that salaries in this field are generally inadequate, the American Public Health Association has appointed a Committee on Salary Standards to study the present remunerations in the health field and recommend minimum standards. The members of this committee are: Dr. Carrol Fox, United States Public Health Service, chairman; Dr. S. J. Crumbine, state health officer of Kansas; Dr. J. A. Ferrell, International Health Board; Dr. J. R. Phelps, U. S. Navy Medical Corps; Mrs. Maud Wood Park, National League of Women Voters; James A. Tobey, National Health Council, secretary.

A letter has recently gone out from the secretary of this committee to the various state departments of health requesting data from which the desired salary statistics may be compiled. The committee will issue its report later.

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Archbishop Hayes Urges Coöperation of Catholic Clergy in Promotion of Public Health.—The spirit of coöperation which public-health workers are meeting with is well illustrated in the following letter which Archbishop Hayes recently sent out to the Catholic clergy of New York:

Reverend and dear Father:

The month of November promises to make many claims, temporal as well as spiritual, on our attention. It would be really impracticable for me to comply with innumerable requests, now pouring in, for a pulpit word in behalf of many praiseworthy undertakings of common benefit to all.

There is one, however, I consider of so much importance that I shall ask the Reverend Pastors to take particular notice of, since it concerns public and personal health.

A nationwide movement is under way to help arrest the fell disease of cancer. Several prominent Catholic physicians have appealed to me to urge our Catholic people to take advantage of the literature that will be placed at our church doors next Sunday with regard to the control of cancer.

It appears that this terrible scourge is a menace to all and is on the increase, whereas simple knowledge and timely precaution will save numerous lives from this affliction.

Remember Christ's mission was one of healing both soul and body. His compassion for suffering humanity stands out clearly in Holy Writ. His miracles generally were wrought to cure disease and relieve pain. In imitation of Him the Church, by prayer, sacrament and teaching, urges man to develop a healthy body, a clean mind, and a spotless soul.

Cancer Week will be held from October 30 to November 5. Public lectures will be given throughout the city.

The following week, November 8-19, the Health Institute conducted by the American Public Health Association will convene, with a Health Exposition, in which our City Department of Health is deeply interested. The idea is to bear to the people of New York a message of health for the prevention of disease, and the better understanding of personal hygiene and of general sanitation.

I trust our people will avail themselves of the opportunities provided, not only for their own physical betterment, but for the common social welfare of our beloved city.

Praying that this letter, written under the patronage of St. Raphael, the Archangel called by St. Gregory "The Medicine of God," may prove of some service in bestirring many to increased helpfulness and carefulness in the interests of health, I am, with a blessing,

Faithfully in Christ,

PATRICK J. HAYES,
Archbishop of New York.

✣

Italy Combats Social Diseases.—The Italian Institute of Hygiene, Prevention and Social Relief seeks to embody and diffuse through-

out the nation the principles and methods of social medicine. The Institute acts as a center of observation and study of the so-called social diseases and of the preventive measures, official and unofficial, designed to control and combat them.

To this end it possesses a library already grown to considerable proportions, thanks to the courtesy of the Italian Foreign Office, the Ministry of the Interior, and the presidency of the Medical-Scientific Press of Italy, through whose intervention the Institute has been assured of the official and semiofficial documents of foreign states and of Italy, dealing with the problems of social science and medicine. The material thus accumulated is used by the experts of the Institute for the preparation of propaganda in its various forms, which is further disseminated by the Institute throughout political circles, in schools and the army, and among the industrial and agricultural classes.

✣

Tabulation of Children's Year Weighing and Measuring Tests Shows Heights and Weights of American Children.—The largest mass of data on the heights and weights of children under 6 years of age ever brought together in this country has been made public by the U. S. Department of Labor through the Children's Bureau. The report entitled "Statures and Weights of Children Under Six Years of Age" is based on records secured with the coöperation of individuals and organizations throughout the country in connection with Children's Year. Besides showing the present average heights and weights of the younger children of America, these records form a basis for measuring possible future progress in physical development. Of the 172,000 records tabulated, all of which met certain requirements as to accuracy and completeness, 167,024 were records of white and 4,976 records of negro children.

Boys under 6 years of age were found, according to the report, to average from one-third to one-half an inch taller and to weigh about a pound more than girls of the same ages. They were also heavier than girls of the same stature. California children were found to be slightly taller and heavier than other groups in the study—a difference for which climate or some factor other than the nationality composition of the population, which closely resembles that of other parts of the country, is held responsible. The shorter stature noted in the New York City group is, however, attributed to the presence in that group of a larger proportion than in the country as a whole of short-statured races, such as the Italian and Jewish.

A selected group of children of native parentage showed very little deviation in average height and weight from the averages of the larger group including children both of native and foreign-born parents. Children in rural areas slightly exceeded the average for city children in both stature and weight, while the heights and weights of negro children under 4 years of age as compared with white children of the same ages showed a deficiency in weight of 11 ounces for boys and 9 ounces for girls, and stature deficiencies of two-fifths and one-fifth inches respectively. These deficiencies, greatest at 1 year of age and under, may result from the poor nutrition and unfavorable social and economic conditions that cause a high mortality rate among colored infants, or, perchance, may be due to a racial difference in rate of growth. At five years of age practically no difference in average height and weight is found between white and negro children.

✣

Child Health Work in Austria.—The new medical program of the American Red Cross, which went into effective operation in Vienna on July 1, has given a new impetus to Austrian child-health work, which was threatened with complete extinction owing to financial difficulties. The Red Cross has taken over 100 child-health stations which were about to close from lack of funds, and has guaranteed financial support for a period of one year.

Austria was a pioneer in scientific child-health work, and is still in many ways far in advance of other nations. Vienna's first child-health center was established in 1904. A few months later several similar centers were opened which operated in the same manner and were supported by the parent organization.

The work of the stations grew slowly but steadily until 1911, when the interest in it was greatly stimulated by the International Congress, which met that year in Berlin for discussion of the care of children of the nursing age. Stations were soon opened for the examination and advice of pregnant women and it was required that all children born in Vienna should be registered. In 1914, at the

beginning of the war, child-health work in Austria was showing good results.

After the war, when the appalling condition of the children became so glaringly apparent, and foreign agencies came to Vienna with the idea of giving what aid they could to the Austrian people, especially the children, it became necessary to have many stations for the examination of children to determine which ones most needed nourishment.

After the general examination, the mother of each child received a certificate indicating the child's health class. If this were one of the categories rationed through the Friends' depot, the mother could obtain at the station where her child had been examined a card, signed by the physician, which entitled her, on registering at the Friends' distribution depot named in the card, to draw four fortnightly food-packets for the child, or for herself, if she were nursing the child. Each packet contained a quantity of food, sufficient for two meals a day for fourteen days for the child to which it was issued.

In January, 1921, it was found that the city could not support all the centers which had been established. When, in 1921, the American Red Cross decided on a child-health program, it was thought that the best plan was to make use of the stations which were already established and to retain, when possible, the personnel operating them. It was also decided that, while the American Red Cross would be responsible for the plan of operation, the payment of the personnel and the provision of the medical supplies, the local authorities would furnish the buildings or rooms for the centers, and provide the heat and light. In conjunction with the American Red Cross they would choose the personnel, the American Red Cross reserving the right to refuse any undesirable selections.

A salary scale was also agreed upon, which, at present Austrian exchange, makes the cost of operations for each station considerably less than $1,000 per year.

Short, practical courses in the care of infants and young children are given to all nurses and workers at the various centers. Much time is spent in home visiting. During the year the number of home visits made will probably be about 180,000, an average of 1,800 visits per station, handled by one worker at each station.

The relief work in connection with the health centers consists of free food rations for children under 4 years of age, the provision of cod liver oil to all children who need it and whose parents are unable to buy it, and the distribution of clothing.

The preparation of milk for infants who are not breast fed is another valuable feature of the work.

✣

Italian Preventorium For Infants.—The Italian Red Cross took over last June the "Emilio Maraini Institute," founded in Rome in June, 1920. This infant home is considered a model from the social welfare point of view. The Emilio Mariani foundation has as its sub-title: "For the infants of poor mothers," and has for its object "to shelter, nourish, and assist poor children of both sexes, born in or out of wedlock, whose mothers are unable to give them breast feeding owing to illness, especially of a tuberculous nature."

The rules of the institution also contain the following provisions: to care for the infants until entirely weaned; no nursing mother, whether married or unmarried, taken into the institute, is separated from her child; the institute undertakes, when necessary, the moral regeneration of the women it receives, making a point of persuading mothers to recognize their children; finally, the directors of the institute have established relations with charity homes for children so as to prevent the latter returning to dangerous home surroundings after the institution in question has finished with them.

Accepting the principle that human beings, although not born tuberculous, are exposed to this danger, and that "the danger of tuberculosis is all the greater in the case of children born of tuberculous mothers," the Maraini preventorium intends to solve the prophylactic problem of tuberculosis from the very beginning by removing the infant from the infected atmosphere.

For this reason, Professor Valagussa, who has charge of the Maraini institution, can affirm that it differs from other organizations of the same sort, inasmuch as it takes up the fight against tuberculosis from the moment the new-born infant utters its first cry, that is to say, when the lymphatic system is still free from all tuberculous infection. According to the statutes and rules of the institute, it is a condition for admis-

sion of children that they must not have passed the third month of life.

Whenever the doctors of the poor districts notify the institute that there is a tuberculous woman about to give birth, a physician belonging to the institution is sent to examine the patient and to make the necessary arrangements so that the child is placed in a special room, where he is kept under observation, until the incubation period of the exanthematous diseases is passed, being meanwhile subjected to minute examination so as to be able to establish a clinical record regarding his condition at the time of admission.

The children adopted by the Institute are nourished in the natural way, i. e., by breast feeding. For this reason, wet nurses are enrolled according to a system which offers all the necessary guarantees and which includes a clinical examination. One of the primary objects of the institute is to supervise the personal hygiene of the nurses as well as their food, this being rigorously controlled.

According to the report for the first year of work of the Maraini foundation, 113 babies were taken in, including children of sick mothers and of wet nurses. Of these ten died, including two prematurely born.

In taking over the Maraini foundation, Senator Ciraolo, chairman of the Italian Red Cross, declared that not only would the institute be maintained on the high level which it had reached, but that it would be their endeavor to make this institute the nucleus of a children's city, and to see to it that other foundations of this sort follow, to carry on the good work. The queen of Italy has expressed her intention of confiding to the care of the Italian Red Cross the infant dispensary which she has founded, so that it may work in close contact with the Maraini institute.—*Bull. League of R. C. Societies,* Sept., 1921.

✣

Other Diseases Are Causes of Heart Disease.—"Heart disease is not communicable and its victims can be released from the fear of sudden death and adjust themselves to almost normal freedom in life."

This is the message of hope brought to health officers and public-health nurses by Dr. Haven Emerson, former commissioner of health of New York, in a recent address in Michigan.

"Whenever heart disease appears among children," says Dr. Emerson, "it is usually due to insufficient convalescence, or improper care during recovery from illness. The problem of prevention and elimination of tuberculosis and the prevention of heart disease is very similar, with the exception that heart disease is due to infection with many different kinds of bacteria and to many faulty habits and modes of life.

"People must be impressed with the fact that in contracting scarlet fever, typhoid fever, measles, sore throat, rheumatism, tonsilitis and other acute infectious diseases, the victim is in danger of developing heart disease, an affection much worse than the original disease which caused it. It is one added reason for paying attention to prevention of diseases and proper convalescence. The person who has heart disease must be protected against reinfection; he should receive the medical care which will give him the largest amount of health efficiency."

Heart disease, according to Dr. Emerson, has replaced tuberculosis as the cause of the largest number of deaths in cities and country and among all races. While heart disease is not preventable, the diseases causing it are preventable, and it is possible to postpone death among those affected with heart disease.

✣

Acknowledgment.—Through an oversight, it was neglected to state, in connection with "A Bibliography of References to Health Legislation," published in the December issue of the JOURNAL, page 1090, that this Bibliography originally appeared in *Public Health Reports,* August 12, 1921. Copies of it can be obtained from the United States Public Health Service, as reprint No. 684 of the *Public Health Reports.*

LEGISLATION—FEDERAL

From the Bi-Weekly Report of the National Health Council, December 5-19, 1921

PLANS OF CONGRESS

The special session of the Sixty-seventh Congress adjourned November 23, 1921. The regular session convened December 5, and will be in session, probably, until the middle of the summer. Those bills relating to health which were introduced in the first session and not acted on are now before the second session without having to be reintroduced. There are, therefore, about 150 measures which affect public health to some degree now before Congress. A complete list of these is contained in the index to Statement No. 15, supplemented by Statesments Nos. 16 and 17, which bring it up to date.

PROGRESS ON MATTERS PREVIOUSLY CONSIDERED

A. 1. Government Reorganization. Plans of the Smoot-Reavis Joint Congressional Committee. After a conference with Walter F. Brown, chairman of the Joint Congressional Committee on Reorganization of the Federal Departments, on December 2, 1921, Dr. D. B. Armstrong reported that Mr. Brown outlined the following plans of his committee:

(a) The Smoot-Reavis Committee expects to prepare in one bill all the plans for federal reorganization.

(b) A department of welfare will be included. In it will be placed all of the present welfare activities of the government, but no new ones will be established, owing to the desire for federal economy.

(c) The plans for this department of welfare will follow, in general, those outlined in the Fess-Kenyon bill for a department of public welfare. There will be divisions of health and of education.

(d) The committee is working on a definite schedule, and thus far has kept up with that schedule. They expect to introduce this bill in Congress by February, 1922, and hope that it will be passed by June. Subsequent conference with General Sawyer confirmed Mr. Brown's statement.

A. 2. Promotion of the Welfare and Hygiene of Maternity and Infancy. Plans for administration. The Children's Bureau of the U. S. Department of Labor, which administers this law, is now working on plans for its operation. The Bureau has issued several statements regarding the law, including a pamphlet giving the text of the act and maximum amounts available to each state, and an article entitled "Facts of Interest About the Sheppard-Towner Act for the Promotion of the Welfare and Hygiene of Maternity and Infancy of November 23, 1921," which was published in the January edition of *Mother and Child*, the monthly magazine of the American Child Hygiene Association, Baltimore, Md.

During the 1921 legislative sessions, six states passed laws accepting the proposed act. They include Delaware, Minnesota, New Hampshire, New Mexico, Pennsylvania, and South Dakota. Action taken by any of the twelve states whose legislatures meet in 1922 will be reported in the *Bi-Weekly Bulletins on State Health Legislation* to be issued by the U. S. Public Health Service with the coöperation of the National Health Council.

S 2708. Medical Supplies for Russian Relief. This measure, introduced by Senator Wadsworth, was passed with little opposition on December 6, 1921, by the Senate. The bill then went to the House and was referred to the Committee on Military Affairs. It provides that the Secretary of War shall turn over to the American Relief Administration in Russia such medicines, medical and surgical supplies for which the department has no further use.

H. R. 9237. Urgent Deficiency Bill; passes Senate and goes to conference. The bill, which includes a number of appropriations in the interest of public health, passed the House November 22, 1921, and went to the Senate, where it was amended and passed that body on December 12, 1921. Among the few changes made by the Senate that concern public health was an appropriation of $1,000,000 made immediately available to the director of the U. S. Veterans' Bureau to be used in providing additional hospital and dispensary facilities for disabled war veterans. This money can be used for new construction to provide accommodations for officers, nurses or attending personnel at hospitals now in the course of construction, or in any other improvements deemed necessary by the director.

H. R. 9291. To Reorganize and Promote the Efficiency of the U. S. Public Health Service. Introduced by Representative Dyer in the special session of Congress, this bill was reintroduced by the same author on December 5, 1921, and referred to the Committee on Interstate and Foreign Commerce. A summary of this bill in Statement No. 13,

p. 5, (A. J. P. H., December, 1921) gives full details of its provisions. It would commission five hundred and fifty officers of the reserve in the regular service, provide for equitable promotions, set the term of the surgeon general at four years and make his selection by the President obligatory from among the commissioned personnel, and establish corps of nurses, dietitians and reconstruction aids. A similar measure was introduced in the Senate at the special session by Senator Watson of Indiana.

A. 6. Hospitals for Ex-Service Men. Secretary of the Treasury A. W. Mellon has announced his approval and authorization for the expenditure of $3,900,000 for additional hospital facilities for disabled ex-service men. These sums have been previously appropriated by Congress. They will be made as follows:

(a) $2,500,000 to provide a hospital for tuberculosis and nervous and mental cases among former negro soldiers at Tuskegee, Alabama. The institution will contain 1,000 beds.

(b) $1,400,000 for a permanent soldier hospital for nervous and mental cases at Palo Alto, California. This hospital is now operating with temporary buildings, which will be made permanent and the capacity increased to 1,000 beds.

NEW LEGISLATION

H. R. 8928. Government Salary Reclassification. Passed the House, December 15, 1921. Referred to Committee on Civil Service of the Senate, December 15, 1921. This measure, known as the Lehlback Bill, provides for the classification of civilian positions within the District of Columbia and in the field service. While its terms are open to future construction, it appears that the bill in its present form would reduce the pay of medical men in the Public Health Service and disturb the present salaries and commutation privileges now granted to these officers, privileges which are similar to those in the army and navy.

The bill puts all civilian employees of the government into the following eight groups: professional, sub-professional, clerical, institutional, custodial, inspectional, police and criminal investigation service, and fire service. Under the first group are expressly included the following callings: bacteriology, biology, chemistry, child hygiene, dentistry, dietetics, engineering, medicine, pathology, pharmacy, social economics, statistics, and therapeutics. The professional group is then arranged in six grades. The first is a junior one for those performing the simplest kinds of professional work, and has salaries of $1,620, $1,740, $1,860, and $1,980. Grade two would include those classes of positions, the duties of which are to perform under general direction "assigned professional work requiring professional training and previous experience but not the exercise of independent judgment." The compensation in this grade would be $2,100, $2,280, $2,460, and $2,640. Grade three includes those who perform independently or with associates from the lower grades responsible work requiring extended training and considerable successful previous experience. Salaries here range from $2,820 to $3,540. Grade four is that in which independent and highly expert professional work would be performed, or the administration of a minor division of a large organization or a major division of a small organization. Salaries would be from $3,720 to $4,620. Grade five includes those acting as assistant heads of large professional organizations, administrative heads of major divisions, heads of small organizations or consulting specialists. Here the salaries would be from $4,860 to $5,460. Finally, grade six includes the technical and administrative heads of major professional or scientific bureaus. The compensation in this grade is from $5,400 to $6,600.

From the above outline it would seem that many of the officers of the Public Health Service would fall in grade two. Owing to the character of work and present type of organization of the Public Health Service, it must have a mobile corps of trained sanitarians available for quarantine and epidemic duty at any place where emergencies arise, as well as in the operation of its hospital system for disabled service men. It is believed by many that it would not be practical to classify an officer according to the duty performed; for, in the Public Health Service he might be performing one duty to-day and an entirely different one to-morrow. The requirements of the medical personnel of the Public Health Service are essentially the same as for the medical corps of the army and navy. An attempt is accordingly being made to have the Public Health Service exempted from the provisions of this bill.

H. J. Res. 229. Suppression of Traffic in Opium and Habit-Forming Drugs. Introduced

by Representative Kahn, December 7, 1921. Referred to the Committee on Foreign Affairs. This resolution asks that the American delegates to the Conference on the Limitation of Armaments request the foreign delegates to bring about an early conference for the purpose of suppressing the manufacture and transportation of opium, morphine, cocaine, and other habit-forming drugs among the nations of the world. The chairman of the House Committee on Foreign Affairs also issued an announcement that the committee would make a thorough investigation into the increase in the use of drugs in this country and attempt to trace the sources of supply.

H. R. 9490, Medical Service for Coast and Geodetic Survey. Introduced by Representative Winslow, December 12, 1921. Referred to the Committee on Interstate and Foreign Commerce. This bill authorizes the U. S. Public Health Service to render medical aid to the officers and seamen of the Coast and Geodetic Survey in the same manner that the medical corps of the navy gives medical service to its officers and men. The bill also directs that, when practicable, a medical officer be detailed to each of the vessels of the Coast and Geodetic Survey.

H. R. 7456. Public Health in the Tariff. Passed the House, July 21, 1921. The tariff bill contains the following duties of interest to health workers:

Calomel and other mercurial compounds, 30 per cent ad valorem.

Chemicals, drugs, medicinal substances imported in capsules, pills, tablets, lozenges, troches, ampoules, jubes, or similar forms, 25 per cent ad valorem.

Medical compounds containing alcohol, 20 cents per pound and 25 per cent ad valorem if 20 per cent of alcohol; 40 cents per pound and 25 per cent ad valorem for 20 to 50 per cent alcohol; 80 cents per pound and 25 per cent ad valorem for over 50 per cent alcohol.

Formaldehyde products, 25 per cent.

Dentifrices with alcohol, 40 cents per pound and 60 per cent ad valorem; without alcohol, 60 per cent ad valorem.

Surgical and dental instruments valued at not more than $5 a dozen, 60 cents per dozen; valued at more than $5 a dozen, 12 cents per dozen for each $1 per dozen, and in addition to all of foregoing, 35 per cent ad valorem.

Books of all kinds, 20 per cent ad valorem.

Tooth brushes, 35 per cent ad valorem.

These are only some of the articles mentioned. In the 173 pages of Title I, which gives the dutiable list, may also be found drugs, chemicals and medicines in great variety, optical products, microscopes, laboratory instruments, milk products and food of every description.

The free list (Title II) contains:

Antitoxins, vaccines, viruses, serums, and bacterins, used for therapeutic purposes.

Quinine and its compounds.

Radium and its salts.

A number of drugs are also included.

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STATE HEALTH NOTES—GENERAL

Alabama

The report of the malaria control central administration unit of the Alabama State Board of Health just issued shows a big increase in malaria control work over 1920.

This unit, operating on a county-wide basis in five counties in the state, reports that during 1921 there were done about 110 miles of ditching, 1,300 miles of oiling, and 86 miles of clearing, under the direction of the unit. In addition 136 mosquito breeding ponds were stocked with top-minnows. There were given a total of 110 lectures to audiences numbering 7,393; 141 demonstrations of some phase of the work at which 1,243 people were present, and 346 conferences at which 2,253 public officials and other interested persons were present.

During the year 64 malaria projects were carried out in Alabama, protecting a population of 125,000 and an area of 134 square miles. During the preceding year 12 such projects were carried on, protecting 32,500 people and an area of 34 square miles. The cost per capita was $0.64 in 1920, and was reduced to $0.48 in 1921.

The State Board of Health comtemplates a big expansion of malaria control work in the state during 1922, with an organization based on the county-wide work as carried on during 1921.

This work will be done under the direction and control of the various county health officers, the State Board maintaining a staff of trained men to direct and assist these county health officers. It is expected that at least 15 counties will be thoroughly worked, and that several hundred square miles and several hun-

dred thousand people will be protected from the disease.

A demonstration in malaria control work recently carried out by the State Board of Health at Demopolis, Alabama, shows what financial returns may be expected from malaria control work properly carried out.

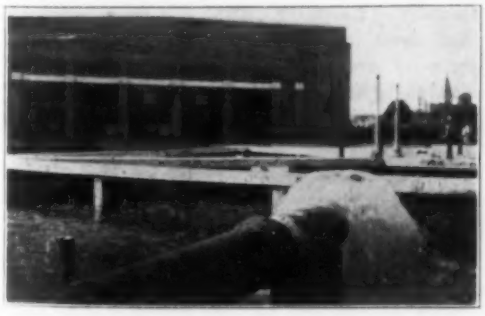
A house to house canvass was made and the actual cost of malaria to the people was estimated from doctor's bills, medicines and loss of wages, both for the year the work was carried on and also for the previous year. The results were as follows:

	Cost: Doctors and Medicines	Economic loss	Total loss
Year previous to work	$3 110	$23,135	$26,245
Year of work	106	415	521
Saving	$3,004	$22,720	$25,724

The number of cases of malaria was reduced from 194 to 12. A most striking fact is that the people of Demopolis effected a saving of $25,724 by doing work costing but $3,000. That is, they obtained a return in actual money saving of several hundred per cent on their investment.

Florida

The State Board of Health of Florida, through its Department of Engineering Bureau, has ordered the city of Jacksonville to cover the reservoir from which the city's water supply is furnished. This huge basin, 150 by 250 by 12 feet deep is supplied by fifteen artesian wells through the big inlet shown in the picture. The estimated cost of concrete slabs about six inches thick for the cover is $27,000.



Inlet of the Reservoir—Jacksonville

A few years ago this reservoir was isolated. Now it is in the center of the city with people living all around it. The basin was originally left uncovered purposely by the authorities in order that the water might be aërated, thus eliminating odors such as are emitted from artesian wells. The vigilant eyes of health officials have been watching and analyzing this water and have found it contaminated by the dust from the streets. The whirring automobiles and street cars now keep a scum of dust upon the water that settles in and on the sides of the reservoir, and it has become a menace to the health of the city. In the event of an accident, the city has a three million gallon reservoir built of concrete above the ground, thoroughly protected from dust and insects. The analysis of this water shows it to be far superior to that of the open reservoir.

When the cover has been placed on the reservoir, Jacksonville, getting as it does, its water supply from artesian wells, clear and cool, will have the finest water to be had.

The pressure is direct from two mammoth pumps, one of which is running all the time. In addition to this, Jacksonville has a high pressure system with special mains supplied by electrically driven rotary pumps, the stream of which will drive a hole through a wall because of the immense pressure. This is used in case of fire only.

The domestic water supply is furnished through meters, thus eliminating all wastage. The sanitary patrolman reports all leaks, which receive immediate attention. At the plant oil is used for the making of steam in the boilers, avoiding smoke nuisances.

Illinois

Arrangements have been completed for conducting a public health institute in Chicago, March 13-18, 1922. The institute was scheduled by the United States Public Health Service while the State Department of Public Health worked out the program and engaged most of the lecturers. The institute will be under the direction of Dr. I. D. Rawlings, state director of public health.

The Chicago institute will deal only with the subject of venereal disease control and allied problems. Courses will be given in syphilis, gonorrhea, the delinquent, clinic management, work of the venereal disease nurse and health education. Lecturers include S. P. Thrasher of Chicago, Miss Jessie Binford of the Interdepartmental Social Hygiene Board, Judge J. W. Schulman of Chicago, Dr. H. G. Irvine of the Minnesota State Board of Health, Dr. John Dill Robertson, health commissioner of Chicago, Dr. Lee A. Stone of

Chicago, Judge Harry Olson of Chicago, Mr. Bernard C. Roloff of the Illinois Social Hygiene League, Dr. G. Frank Lydston of Chicago, Dr. O. S. Ormsby of Chicago, Dr. Louis Schmidt of Chicago, Dr. W. A. Evans of Chicago, Albert Webster of Chicago, Dr. John H. Stokes of the Mayo Foundation, Dr. Stewart Paton of Princeton University, Dr. Martin F. Engman of St. Louis, Dr. I. A. Abt of Chicago, Dr. Holdie Hoffman of Chicago and Dr. C. C. Copelan of Springfield.

In addition to the regular courses, the institute will be featured by daily luncheons with special speakers. Programs of the institute have been printed and may be obtained upon request from the Illinois State Department of Public Health.

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A recent investigation by one of the state health officers into circumstances that surrounded an outbreak of eleven cases of typhoid fever in St. Charles Township, Kane County, brought to light an unusually tragic sequence of events and demonstrated afresh the value of milk pasteurization. The primary case appeared on a farm where milk is produced and sold in Chicago. This case was described as being neuralgia and when the patient failed to improve she was removed to Aurora. Shortly afterwards two other cases appeared on the farm, one of which proved fatal. In the meantime the milk from the herd continued to be sold in Chicago. It was also used for food on the farm by a threshing crew, and a few neighbors obtained it in small quantities. Among those who used the milk raw, eleven cases of typhoid fever developed, three of which terminated fatally, while no cases were reported from Chicago where the bulk of the milk was distributed after pasteurization.

It is reported that no contacts on the farm were immunized with triple typhoid vaccine, and that no quarantine or sanitary precautions were established until most of the eleven cases had developed. In view of these circumstances, together with the additional contention that a correct diagnosis was not made until several cases were far advanced, the families have, entered suit against the physician employed, charging him with neglect of professional duty.

Indiana

Robert Burdine, leper, who was discovered in Indianapolis with anesthetic leprosy about two years ago, was placed under quarantine by the State Board of Health and treated with the ethyl ester of Chaulmoogra oil. The board has now pronounced him cured and terminated the quarantine. The most careful search does not find in the nose or elsewhere the lepra bacillus which at the beginning of the treatment was easily discovered, every slide showing the organism. The State Board of Health is compelled to assume that this leper is cured because there is no evidence that he has the disease and the law therefore cannot hold him.

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The State Board of Health at its regular quarterly meeting January 11, reorganized its division of infant and child hygiene so that it is possible to accept the national appropriation which has been made for the different states. Governor McCray has accepted in the name of the state the appropriation of the national government and things will be in readiness when the appropriation is distributed to go ahead with the work as vigorously as possible. In this work the State Board is now making arrangements to carry lecturers on public health over the state in flying machines.

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A public health institute will be held in Indianapolis, February 13 to 18, under the auspices of the U. S. Public Health Service, the Indiana University School of Medicine and the State Board of Health. The institute course of lectures will begin at 1 p. m., Monday, February 13, and close at noon Saturday, February 18.

In addition to the lecture course there will be a series of clinics on tuberculosis, a series of clinics on the venereal diseases, an intensive laboratory course and a woman's conference. The entire course will be so arranged that those in attendance may select the subjects of greatest personal interest and may plan their attendance accordingly.

Ample opportunity will be given for personal conference with the various lecturers, with opportunity and provision for group meetings.

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The State Board of Health has established a traveling milk laboratory and engaged Mr. Frank C. Wilson to conduct it. The milk laboratory is set up in each city he visits and analysis of milk is begun. Samples are collected from places where milk is sold and analysis as to their bacterial content is made and a numerical index found for the purity

of the milk supply. The quality of the milk must be according to the requirements. At Huntington school children are being supplied with the school lunch daily, working men are drinking milk who rarely used it before and coffee and tea are being discarded.

Michigan

"Men, primarily men, not binder twine, horse collars or reed furniture, should be the product of state penal and correctional institutions."

So asserts Dr. R. M. Olin, commissioner of health, who believes that proper supervision of the health of the inmates will play an important role in their rehabilitation. The new bureau of institutional health administration of the State Department of Health, headed by Dr. R. A. Macgregor, has had charge of this work since September 1, 1921, though the department has been actively concerned with institutional health surveys since the investigation of Ionia Reformatory last February.

Approximately 4,000 physical examinations have been made since the start of the work. Complete health inventories are kept of every case and advisable corrections and treatment carried out. Inmates are now being paroled free from disease and in better health than ever before in their lives, according to Dr. Macgregor. "This raises their self-respect," he says, "and is a big factor after release."

Full time physicians are now installed at the Ionia Reformatory, the Jackson State Prison, the Industrial School for Boys at Lansing, and the Industrial School for Girls at Adrian. Authorities are now endeavoring to secure physicians to fill several other vacancies. A staff of three dentists is in charge of dental hygiene at the institutions. Two additional dentists will be employed to handle this phase of the work adequately.

New York

In putting good health alongside of good conduct and both alongside good records in the three R's, the schools of Rochester have taken an important stand. "Credit given for athletics." Nothing new about that. But "Credit given for nutrition and the correction of remediable defects." Here is something decidedly new. It is expected that the time is not far distant when the Rochester schools will refuse to graduate children who have not had remediable defects corrected. While it is the most prevalent of physical defects, malnutrition is one of the easiest defects to remedy. Rochester has found that, through the nutrition class method, it is possible to bring a child up to correct weight in from twelve to twenty weeks and when the child has attained normal weight, experience shows he does not relapse except for possible short periods during some unusual strain.

By linking up the school, the home, the physician and the child's own interest, the nutrition class has a parallelogram which is complete and which is sure of results. It is only fair to say that the Rochester workers were trained by Dr. William R. P. Emerson, of Boston, in the institutes held under the auspices of the local Tuberculosis Association last year and this, the second successful course of this kind having been given October 3 to 15, 1921. Registration was not limited to Rochester persons. Mrs. Ethel McC. Hendriksen is executive secretary of the Tuberculosis Association of Rochester and Monroe County.

Ohio

A perusal of the vital statistics shows that Cincinnati's death-rate for 1921, per 1,000 of population, will be approximately 14.1, the lowest in the history of the Queen City, as compared to 15.1 for 1920. The average rate for the decade prior to 1918 is 16.7. Every point of reduction in the crude death-rate means a saving of 400 lives.

In nearly all of the principal causes of death, we see a sharp shrinkage in fatal results.

The cumulative effect of public-health work and social service is reflected in the relatively small number of deaths from tuberculosis. The total will be a little under 600, as compared to 619 for 1920 and the annual toll of 950 a few years ago.

Influenza does not merit mention, only 43 deaths having been recorded. Heart disease, cancer, and cerebral hemorrhage played important roles, claiming as their toll 892, 485, and 442 respectively. There were only 14 deaths from typhoid, and 10 of these were among imported cases.

The small number of deaths, 33 per 100,000 of the population, caused by gastroenteritis in children under 2 years, is a tribute to infant care, public-health nursing, and the purity of the milk supply. In 1910 the rate was 103.8; last year it was 29.

The number of births recorded is the largest since the war. Cincinnati is also doing her part to conserve the infant population and we shall probably have an infant death-rate, per 1,000 births recorded, as low as 75.

In appraising public-health activities for 1921, mention should be made of the campaign against malnutrition, which has been made the basis of school medical examination; the public-health nurses, who function in all of the bureaus of the medical division, under the plan of generalized nursing, and the splendid public service of the laboratory.

The appropriation for health work was approximately $162,000, or at the rate of 40 cents per capita.

Oklahoma

A bureau of maternity and infant hygiene is being organized in the State Health Department in connection with the Sheppard-Towner bill. Miss Leila Hoagland, director of public-health instruction, will have charge of the bureau.

The state tuberculosis sanatorium at Talihina for whites, and the one for colored patients at Boley, Oklahoma, opened December 1. The third sanatorium, located at Clinton, will be completed and opened for patients about April 1.

South Carolina

The Department of Rural Sanitation and County Health Work of the South Carolina State Board of Health was severely crippled this year by having its appropriation reduced two-thirds. With the sum of $10,000 it was impossible to give financial assistance to seven counties and run the administration office. A conference was held with the county health officers as to the advisability of discontinuing the departments or running them on a very reduced scale. The International Health Board was consulted and their promised appropriation was secured with the understanding that they would materially cut their appropriation for 1922.

Each county health officer is working full time in his county, but is given a number of counties without health departments which he is to assist during the year in some way, if called on.

The deparment is offering a limited sum of money and the personal supervision and direction of the state director to any county which will organize a county health department. It proposes to help finance these counties for a few years, until the work establishes itself, and then expects the county to make full appropriation. In this way a county health department will be established in every county, with trained, experienced personnel under state supervision.

Last year there was a marked decrease in total deaths, and deaths from preventable diseases, in every county where the Department of Rural Sanitation and County Health Work has worked.

There was no money with which to run the moving picture unit this year, but believing this work too valuable to allow the equipment to remain idle, this department was financed by advertisements and personal contributions. During the summer months eleven counties were visited and 87 meetings were held at which moving pictures on health education were shown to a total attendance of 18,250 people. In Oconee alone, as a result of the film on Tuberculosis in Cattle, 500 cows have been tuberculin tested. In this work there was coöperation with the farm and home demonstration agents. When the county had no agent, the county superintendent of education or the members of the county medical associations made talks for us.

Our county health officers and nurses have given 511 lectures to 40,537 people, and have made 255 talks to school children. A tuberculosis clinic was held in each county for both colored and white, and numerous other free clinics were held in the various counties during the year.

Virginia

Wytheville is receiving high praise from the State Board of Health for the manner in which the community has been working together to control an outbreak of diphtheria. Aubrey H. Straus, bacteriologist of the State Board of Health, says that he has never been in any community where the doctors and people have worked more harmoniously to correct conditions. Recently there have been about fifty cases of diphtheria in Wytheville; but, thanks to excellent medical attention, there were no deaths. Deaths from diphtheria nowadays may properly be charged to neglect or carelessness, either neglect to have antitoxin available or carelessness about administering it in time. The Wytheville doctors were neither neglectful nor careless.

Wisconsin

Sheboygan has changed the status of Dr. H. C. Reich from part time to full time health officer, in accordance with a state law re-

quiring all cities of 25,000 or more to employ full-time officials. Madison has provided for a full time official and will soon appoint. All cities of this class have now complied.

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The Wisconsin State Board of Health is arranging an itinerary for its child welfare "special," a motor truck now building, which will bring modern health instruction for mothers and children to sections whose remoteness is a bar to healthful living. The board has appointed Dr. Blanche Horton, of Indiana, formerly in traveling dispensary work for the Mississippi State Board of Health, as pediatrician in charge of the truck on tour. A nurse and a chauffeur will complete the staff.

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In accepting the Sheppard-Towner act for Wisconsin, the State Board of Health submitted plans for maternity conferences, child health conferences in connection with the health truck, instruction of "mothers' helpers" for work in homes where the mother is in confinement and needs household assistance, "little mothers" classes for young girls, public lectures by physicians and nurses, and special training for graduate nurses and dietitians in infant feeding before taking up field work.

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The State Board of Health is disseminating information throughout the state for the wider education of physicians and laymen in the use of the Schick test and of immunizing methods for diphtheria.

Nova Scotia

One more unit has been added to the hospital area growing up in the vicinity of the Medical School of Dalhousie University in Halifax. The new tuberculosis hospital recently opened shows Halifax taking one more very important step along the lines of public health and preventive medicine. This splendidly appointed tuberculosis hospital will house from fifty to sixty-five persons in advanced stages of tuberculosis. The far-reaching effect of proper housing of persons in the terminal stages of this disease at the stage when they are the greatest menace in the home has an almost incalculable advantage to the public. What is equally important to the public and what must be consoling to the relatives and friends of the tuberculosis sick who need hospital care, is to be advised of the recent reciprocal action of the charities committee of the City Council, and the medical faculty of Dalhousie University.

It will be recalled that some weeks ago the university offered to nominate an expert consulting and attending staff for the new tuberculosis hospital, who will give their services free to the city, and asked at the same time that students in the medical course be given opportunity to study tuberculosis at this hospital. The city officials readily saw that not only would this opportunity for study be of great advantage to the future doctors of Halifax and vicinity, and would insure the highest type of service free, but would also be of great assistance to future doctors of medicine throughout the maritime provinces. They of course acquiesed in the request.

Announcement has just been made by Alderman H. S. Colwell of appointment of the medical director, consulting and attending staff selected under this reciprocal program. They are as follows: Medical director, Dr. W. Bruce Almon; consulting surgeons, Drs. E. V. Hogan and H. K. MacDonald; consulting internist, Dr. Kenneth A. MacKenzie; consulting laryngologist, Dr. R. Evatt Mathers; consulting pathologist, Dr. A. G. Nicholls; consulting obstetrician, Dr. W. Bruce Almon; consulting urologist, Dr. Frank Mack; consulting pediatrist, Dr. M. J. Carney. Attending staff of tuberculosis specialists, Dr. T. M. Sieniewicz, assisted by Drs. M. J. Carney and H. G. Grant. Attending dentist, Dr. G. N. Stultz; pathologist, Dr. D. J. MacKenzie, and resident interne, senior student, Mr. Corey S. Bezanson.

With a staff of such specialists in charge of the tuberculous sick, the public may be assured that nothing will be left undone that might offer a cure or relief for those admitted for treatment. Those who deliberately enter the hospital in order to protect their loved ones at home may be assured of the best of care and of every comfort that a modern hospital can provide, easy of access to friends and relatives.

When the University Health Center, to be erected out of Rockefeller funds, is completed and staffed, the city of Halifax will have the most complete tuberculosis and best coördinated program of any Canadian city, and the medical school will have the facilities for teaching medicine second to no school on the American continent.

INDUSTRIAL HYGIENE AND OCCUPATIONAL DISEASE

Abstracted by Drs. E. R. Hayhurst and E. B. Starr.

Relation of Lead Poisoning in Utah to Mining.—While serving as surgeon with rescue car No. 11 of the U. S. Bureau of Mines, the writer visited the principal metal-mining camps of Utah during the latter part of 1919. In visiting the mines, meeting and conversing with miners, and talking over the medical situation with physicians in various camps, the number of cases of lead poisoning encountered was great enough to attract attention.

An analysis of the returns furnishes some interesting findings. The total cases reported, 371 for 1919 and 224 for 1920, give lead poisoning case rates for the entire population of the state of 0.83 and 0.50 per 1,000 respectively. These rates are strikingly high for a state the principal industries of which are agriculture and stock raising.

It is estimated that at least 75 per cent of the cases reported for the medical centers are chronic or aggravated cases of lead poisoning sent from the mines and smelters to medical centers for treatment in hospitals or by specialists. One specialist reported that during 1919 he averaged one or two cases each month from the mines.

The principal controlling factors in lead poisoning in mining, namely, the nature of the lead ores mined, the dryness of the mine, dust in the atmosphere, and the ventilation, naturally have a great influence on the number of cases of lead poisoning produced. The carbonate and oxide ores are much more prone to cause lead poisoning than sulphide ores. Hence, although a mine may produce considerable lead, if the relative proportions of carbonates and oxides to sulphides are low, the resulting cases of lead poisoning will be fewer.

The case rate from lead poisoning in Utah is so far out of proportion to the death-rate, that the death-rate cannot be taken as an index to the number of cases prevalent. From the reports received during this investigation, the metal-mining industry as represented by the metal mines and smelters is responsible for at least 95 per cent of the industrial lead poisoning in Utah. This was to be expected, as mining and smelting are among the principal industries of the state, with relatively few other industries in which workers might be exposed to salts of lead.—Arthur L. Murray (Surgeon) *Reports of Investigations,* U. S. Bureau of Mines, Serial No. 2274, August, 1921.

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Precautions to Be Observed in Entering Abandoned Exploratory Shafts and Pits.—Much valuable information on the subject of mine atmospheres, mine gases, and the effect of oxygen deficiency on the human system is contained in *Miners' Circular 14,* "Gases Found in Coal Mines" by G. A. Burrell and F. M. Seibert; *Technical Paper 122,* "Effects of Oxygen Deficiency on Small Animals and Men," by G. A. Burrell and G. G. Oberfell; and "Chart of Properties of Mine Gases" by G. A. Burrell. These publications of the Bureau of Mines should be read by all who are interesting in the subject of this paper.

All the gases found in pure air are without color, smell, or taste, but no reliance can be placed on these senses for detecting impure air. Air so impure that it will not support life may not have any disagreeable odor or choking effect that would warn the breather to escape.

Oxygen deficiency in the air of old shafts and pits or other workings may be caused through replacement by carbon dioxide or methane and absorption of oxygen by the rock and timber.

In old metal exploratory shafts, carbon dioxide is more commonly present than methane. Carbon dioxide gas is generated by circulating waters. This gas being heavier than air, tends to settle in the still atmosphere of the shaft rather than mix with the air. Thus, at one point in the shaft the air may support life, but a very short distance below it may consist of irrespirable "black damp." In opening coal measures, or other carbonaceous sedimentary formations, some oxygen is absorbed and some carbon dioxide is given off by the coal. Old abandoned workings often contain large quantities of black damp, because the atmos-

phere is motionless and the oxygen has been removed by long contact with the coal. In addition to carbon dioxide, methane (fire damp) is also given off by the formations. Methane is about one-half as heavy as air, but when mixed with air does not readily separate from it. It forms explosive mixtures with air in proportions between 5½ and 13 per cent methane.

"Methane has no physiological effect when breathed, but by diluting the air until the proportion of oxygen is too low, may render it unfit to breathe. Carbon dioxide does not usually cause distress until 3 or 4 per cent is present, but a large percentage (10 per cent) causes panting and stupefaction." (Gas chart, G. A. Burrell.) When the oxygen of the air in a mine opening is so low that a miner's oil lamp, candle, burning paper, or torch is extinguished, a man should not go or stay in such an atmosphere. A candle or an ordinary miners' safety lamp will be extinguished in an atmosphere containing less than 17 per cent oxygen, and an acetylene or carbide lamp in air containing 12 or 13 per cent oxygen. For this reason, a carbide lamp is not recommended in testing for low oxygen.

While a man might live or even work in air containing 17 per cent oxygen, it would be a most hazardous undertaking to enter or remain in mine air that extinguishes a flame, since this shows only that there is less than 17 per cent but not how much less. Before any abandoned shaft or pit is entered one should lower either a lighted candle or lantern or safety lamp to ascertain the condition of the air. If the flame is extinguished, and there is not sufficient oxygen in the shaft air to support life, one should not attempt to enter the shaft until the air is stirred up by some common means.

Raising and lowering a bucket several times, to bring in fresh air from the surface, is common practice. After working it up and down vigorously for a few moments the air at the bottom of the shaft should again be tested with a flame. If there is no bucket available, the air should be churned by means of a blanket, tent fly, inverted umbrella, or other large light object, attached to a rope. Methane may be expected in abandoned shafts or pits driven in coal measures or carbonaceous slates, or where a heavily timbered shaft is partly filled with water. If methane is suspected, it is best to lower nothing but a miner's safety lamp. If the light is not extinguished the descent can be considered reasonably safe. When no safety lamp is available, and it is necessary to test with an open light, care should be taken to immediately withdraw all persons in close proximity to the shaft or pit as there may be an explosion. It would be safer to clear the shaft before making any test with an open flame. It is common practice among metal-mine prospectors to throw burning grass or lighted paper into an abandoned pit or shaft, but there is a possibility of fire starting if there is any timber or combustible material in the shaft bottom.

Generally, there is no physiological warning of oxygen deficiency in the air. The first decided feeling is one of extreme weakness accompanied by dizziness, better described as partial paralysis, and the victim collapses practically without warning. To guard against this danger, a man should not enter old workings without having a rope tied around his body and at least two men on the top. The rope should be kept taut. Then, if a distress signal is given, the explorer will not only be prevented from falling, but can be quickly pulled to fresh air and his life saved. It is preferable, of course, to use a windlass or other hoisting equipment in exploring such shafts or pits, but such facilities are not always immediately available.— Byron O. Pickard (Mining engineer), *Reports of Investigations,* U. S. Bureau of Mines, Serial No. 2295, November, 1921.

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Illumination as a Factor Favoring Production.—The author discusses the obvious advisability of attention to the health of the worker and especially of labor turnover in relation to poorly lighted quarters, spoilage of work, and production. "If a workman saves three minutes time per day, due to correct lighting, the entire operating cost of the system is paid for." The great value of using the simple little instrument, the foot-candle meter, for determining whether illumination is sufficient on the working plane, is also stressed. (This instrument is made by the National Lamp Works of the General Electric Company, Cleveland, Ohio, and costs about $25.00, E. R. H.).— R. E. Harrington, *Nation's Health,* October, 1921, p. 547.

Births by Occupation of Father.—The Department of Commerce announces that the Bureau of the Census has recently completed a tabulation of the total number of children ever born to those mothers who bore a child in the year 1920, and who gave the occupation of the father. The returns received included 1,461,604 children born in 1920, or all but 3.1 per cent of the total number of children born in that year within the registration area of the United States. The average number of children which each mother had borne, including the child born in 1920, was 3.3, and of these children, the average number living was 2.9.

The returns were tabulated with reference to the occupation of the father. The average number of children ever born ranges from 4.6 for mining foremen, overseers and inspectors to 1.8 for soldiers, sailors and marines. Both of these extreme averages are easily explained, for soldiers, sailors and marines are usually young and therefore have not been married long, while foremen, overseers and inspectors are usually in middle life. For many occupations, however, the ages of the fathers are presumably about the same, and differences shown indicate real differences in the size of families. For example, the low figures for dentists (2), architects (2.1), and school teachers (2.3) are in striking contrast with the figures for mine operatives (4.3), quarry operatives (4.1), bootblacks (3.9), and brick and stone masons (3.9).

In the farmers' families the average number of children born was 3.8; in clergymen's it was 3.3, in lawyers' 2.4, and in physicians' 2.3. The averages for occupational classes are shown in the table published by the Bureau.—Dept. of Commerce, Bureau of the Census, Washington, D. C.

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Occupational Skin-Dust Disease Among Zinc Oxide Workers.—The workers in the zinc oxide plant call the skin disease which they have, "oxide pox." Fourteen of seventeen men examined gave a history of it. Those most exposed to the dust were most susceptible. The author considers that the disease is primarily due to a clogging of the skin glands with the oxide dust, and secondarily to infection. Free perspiration greatly favors the disease, but when the pustular stage occurs, the contents of the papules are very difficult to squeeze out and are composed chiefly of zinc oxide. When freshly made, the oxide is very dry but it is hydroscopic and quickly takes up moisture, so that after storage the moisture content was found to be increased 122 per cent. Minute traces of various contaminates are to be found in the oxide including lead oxide, copper oxide, arsenic and antimony oxide, all found in a specimen which was otherwise 99.199 per cent pure zinc oxide. The author concludes that zinc oxide is nontoxic and that the adulterants are insignificant, but that it is capable of acting as a mechanical conveyor of bacteria. Rubbing together of two body surfaces, especially when moistened with perspiration, greatly favors it, as well as warm weather. The workmen were of the opinion that personal cleanliness was the chief factor in its prevention but special workclothes, frequently cleaned, elimination of dust as far as possible, and plenty of bathing facilities are recommended.—John A. Turner, *U. S. Public Health Reports,* Vol. 36, No. 44, Nov. 4, 1921, p. 2727.

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Auto Gases May Cause Poisoning—Recent investigations made by the United States Bureau of Mines and the Public Health Service have shown that the exhaust gases from automobiles frequently contain sufficient carbon monoxide to cause symptoms of carbon monoxide poisoning. These experiments were conducted as a consequence of several deaths having been reported from garages, the victims apparently having died from carbon monoxide poisoning. The experiments show that this was probably the real cause of death.

Boards of public health in various states have issued warnings to automobilists and especially to those who operate garages. If the following five precautions are taken there will be no danger; if they are neglected a death may ensue.

1. Always open the garage door before starting the engine.
2. Do not allow the engine to run for any length of time in a closed garage.
3. Do not work near the exhaust of a running automobile engine.
4. Special precautions as to ventilation are necessary when in garage pits.
5. When the exhaust is used for heating

a closed car, the system must be free from leaks.

To these instructions may be added this bit of advice. When a person is overcome by gases from automobile engines or any other gasoline engines he should be removed at once to the fresh air and the methods used in resuscitating for drowning should be employed until a physician can be secured. These methods consist in the main of pumping with the arms and alternately pressing and releasing the lower portion of the chest until natural breathing is restored.

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Miners' Safety and Health Almanac.—The Miners' Safety and Health Almanac for 1922 has been issued by the United States Bureau of Mines, in coöperation with the United States Public Health Service. The almanac, which has been compiled by R. C. Williams, Passed Assistant Surgeon, U. S. Public Health Service, besides containing the usual fund of information concerning sun, moon, wind and weather, preaches crispily and snappily the doctrine of Safety First. The almanac is freely illustrated and contains many articles by experts in safety, health and sanitation problems. It is intended for circulation among the million coal and metal miners and quarry workers in the United States. Copies may be obtained from the Bureau of Mines, Washington, D. C.

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Treatment for Carbon Monoxide Poisoning.—The first and most important thing in caring for a case of acute carbon monoxide poisoning is to get the poison out of the blood. Every moment that shuts the oxygen out of the hemoglobin adds to the chances for failure of respiration and failure of the heart. Every minute that the tissues are supplied with only a part of the oxygen they need increases the danger of their degeneration and permanent damage. Both to save life itself and to prevent ill health in the future, it is of vital importance to eliminate carbon monoxide from the blood as rapidly as possible.

The first step is to get the victim away from the atmosphere of carbon monoxide which he is breathing; the next is to supply him with oxygen. This may be done by getting the patient into fresh air, but only one-fifth of air is oxygen. If a tank of pure oxygen is available, it is far better to use it, as the action is much faster and the after-effects, especially the headache, are much less severe and not so prolonged.

In view of the great importance of administering oxygen to these victims at the earliest possible moment, it is recommended that all ambulances be equipped with oxygen tanks. It may be that when the victim is found, his breathing has stopped, or is very weak and irregular. In this case, after quickly removing the victim to good air, or while administering oxygen, one of the rescuers should begin at once artificial respiration, by the Schaefer method.

Continue artificial respiration, if necessary, for at least three hours without interruption, or until natural breathing has been restored or a physician has arrived. Even after natural breathing begins, carefully watch that it continues If it stops, start artificial respiration again.

While the administration of oxygen is by far the most important factor in the treatment and cannot be overemphasized, other things should be done to help the patient. He should be kept quiet and lying flat, to help his weakened heart. When he revives, he should not be allowed to walk about or in any way exert himself, for there is danger of heart failure. Heat from safety lamps, hot-water bottles, or warm bricks, rubbing the arms and legs, and keeping the patient well covered with blankets all help the circulation, and aid in tiding the body over a period of low vitality. The safety lamps, hot bricks, etc., should be well wrapped in cloth or paper as a precaution against burning the patient. Other stimulants, such as hypodermics of caffein-sodium benzoate or camphor in oil, should not be administered except by a doctor, after he has considered the possibility of overstimulation and consequent collapse. The patient should be kept in bed for a day at least. Later he should be treated as a convalescent, being given plenty of time to rest and recuperate. Just how long this time should be depends on the severity of his poisoning and should be decided by his physician.

Complete details of methods employed in the treatment of carbon monoxide poisoning, including a description of the Schaefer method of artificial respiration, are given in a report which may be obtained by applying to the Bureau of Mines, Washington, D. C.

Symptoms of Poisoning by Nitrogen Fumes.—The authors quote Irvine as stating that after an exposure to nitrogen fumes from explosives no symptoms may be evident for a time; yet within twelve to eighteen hours the person may die from acute hemorrhagic edema of the lungs. There may, however (Oliver), be a sensation of painful burning during inspiration of the fumes which ceases when fits of coughing have rejected the poison from the system. The maximum percentage of oxides of nitrogen that may be present in mine air without harm to the workmen breathing it have not been closely established. Carbon monoxide may be one of the forms of poisoning, and Irvine claims that carbon monoxide accounts for most of the deaths in accidents due to the fumes of explosives. Haldane found that mice exposed to 0.05 per cent nitric oxide gas for thirty minutes were dead in twenty-four hours. The symptoms were the same also from the fumes of burning dynamite. Air containing enough nitrogen fumes to cause irritation in the nose or air passages is very dangerous. Irvine states that inhalation of these fumes is a contributing factor in the development of "miners' phthisis."—Allison, Parker and Jones, *Technical Paper No. 249*, U. S. Bureau of Mines, 1921, p. 10.

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The Physiology of Fatigue.—"1. Certain phases of muscular fatigue have been investigated with special attention to the gaseous and osmotic relationships in the blood of dogs.

"2. Hemolysis in vivo occurs in untrained dogs after severe exercise.

"3. The resistance of the red blood corpuscles to laking by hypnotic salt solutions is increased by exercise.

"4. The carbon dioxide content of the blood is decreased in both arterial and venous blood by exercise.

"5. The degree to which the hemogloblin is saturated with oxygen is increased in arterial and diminished in venous blood by exercise.

"6. These changes in gases result in a migration of acids, of which Cl is an example, into the plasma. A diminished osmotic pressure within the corpuscles results and is indicated by an increase in resistance to laking by hypnotic salt solutions.

"7. Certain of these changes are modified by long continued exercise. This failure in the efficiency of the processes of the organism is regarded as fatigue.

"8. The significance to the cardio-vascular and respiratory systems of the changes in the blood gases and the osmotic relationships is briefly considered."—*U. S. Public Health Bulletin No. 117*, May, 1921, Albert B. Hastings, p. 40.

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Census of Safety and Health Workers.—All industrial physicians and surgeons, industrial nurses, and other persons engaged in industrial health work are to be included in the census of safety and health workers now being taken by the National Safety Council in all parts of the country. Although health work in industry, along with safety, has made great strides in the past few years, it is not at present known how many persons are engaged in either of these activities, who they are, or where they are located. This is the first time an attempt has ever been made to list all the industrial safety and health workers. Public safety workers will also be included in the census.

It is believed that the results of the census will give a good indication of how extensive the safety and health activities now being carried on are. The census will include not only members and employes of members of the National Safety Council, but all persons engaged in industrial safety and health work whether connected with the council in any way or not. The council has almost as deep an interest in industrial health work as in accident prevention, and is very closely allied with the American Association of Industrial Physicians and Surgeons. Many health workers and companies employing health workers are numbered among the council's membership.

Every reader of this publication who is professionally engaged in industrial or public accident prevention or industrial health work—whether he is devoting all or only part of his time to accident prevention—is urged to assist in the taking of this census by sending to the National Safety Council, 168 North Michigan Avenue, Chicago, his name and the other data requested in the council's census form which follows.

Name .....
Company or organization.....
.....
City..... State.....
Nature of company's business.....
.....
Is safety your principal work?.....
Please check other activities you engage in:

Fire protection	Engineering (other than safety)
Health and sanitation	
Workmen's compensation and claims	Legal
	Insurance
General executive (such as manager or superintendent)	Welfare
	Educational
	Industrial relations

How long have you been in your present position? .....
Technical or other special education?.....
.....
Signed .....
Title .....

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Accidents in Metal Mines.—Accidents in 1920 at mines producing gold, silver, and miscellaneous metals caused the death of 117 men and the injury of 5,704, according to reports received by the United States Bureau of Mines from operating companies throughout the country. Reports from 2,358 mine operators show that 29,933 employees worked 8,354,830 shifts, an average of 279 working days per man. This group of mines includes all metal mines except those producing copper and iron and those in the Mississippi Valley States producing lead and zinc.

The figures show a reduction as compared with the previous year, of 72 operating companies, 2,197 employees, 222,265 shifts, and 9 fatalities. There was a gain of 12 working days per man, and an increase of 235 in the number of men injured (an injury signifying disability for more than one day). The accident rates for 1920, based upon a standard of 300 working days to the year, were 4.20 killed and 204.82 injured per 1,000 employees, as against 4.41 killed and 191.29 injured in 1919.

States having the highest fatality rates for each thousand employees were New York (22.73), Washington (12.30), Utah (6.29), California (5.83), Colorado (5.35) and Arizona (5.34). Those having the lowest fatality rates were New Mexico (1.34), South Dakota (2.86), Idaho (3.02), Alaska (3.31), Nevada (3.58), and Montana (3.77).

The highest non-fatal injury rates were 316.8 for Utah, 298.0 Idaho, 275.4 California, 266.7 South Dakota, 242.4 New York, 196.6 Montana, 157.7 Colorado, 134.4 Arizona, and 124.0 Nevada. States apparently having the lowest injury rates are not shown, because the abnormally low rates are believed to be due to the absence of state laws compelling mine operators to furnish complete reports to state officials.

Of the 117 fatal accidents, 81 occurred in underground mine work, 19 in shafts, 2 at open-pit workings, and 15 at surface shops and yards. The non-fatal injuries were segregated as follows: 4,602 underground, 192 in shafts, 75 at open pit mines, and 835 at surface shops and yards.

The principal causes of non-fatal accidents underground were: 990 fall of rock from roof or wall, 573 loading at working face, 524 timber or hand tools, 522 haulage, 474 drilling, 220 falling down chute, winze, etc., 151 stepping on nails, 115 run of ore from chute or pocket, and 99 explosives. Of the shaft accidents, 59 were caused by cages and skips, 57 by objects falling down shafts, and 18 by persons falling down shafts. Accidents at open pits were due to the following causes: 13 falls or slides of rock, 11 hand tools, 9 haulage, 6 falls of persons, and 5 by steam shovels. At surface yards and shops the principal causes of accidents were: 131 hand tools, 99 machinery, 98 mine cars, 95 falls of persons, 52 stepping on nails, and 17 railway cars.

Many lives and much property are lost every year because of accidents due to venereal diseases, says the U. S. Public Health Service. So great, in fact, are these losses that the National Safety Council has issued a bulletin on them. For instance, four serious recent railway wrecks were traced to employees who failed because they were suffering from paresis, which is a form of syphilis.

PUBLIC HEALTH LABORATORY NOTES

Abstracted by Arthur Lederer, M. D.

Permanganate Test of the Cerebrospinal Fluid.—The author detects any increase in the albumin content of this fluid by the oxidation of potassium permanganate when there are protein substances present. When this occurs, the tint veers to canary yellow. Among those who have extolled the simplicity and dependability of this test are Rebizzi, who found it useful in differentiating true from false tumors in the brain, and Bardisian, who was able to exclude meningitis by the negative findings in four cases, corroborated by the course. To 1 c.c. of the cerebrospinal fluid is slowly added, pouring it along the wall of the test tube, 1 c.c. of a 1:10,000 solution of potassium permanganate. The tube is then held vertical, and there is no change in tint if the fluid is normal. If not, the zone of contact turns yellow. By jarring the tube a little the entire fluid turns yellow. The reaction is pronounced when the tint changes in less than two minutes; moderate, in three or four, and weak, if the tint does not veer to yellow after five to seven minutes. In several hundred applications of this test, he has found it a constant index of abnormal protein content, sometimes preceding lymphocytosis, although in children the latter usually appears first.—P. Boveri, *Policlinico*, 28, 450 (1921); *Jour. A. M. A.*, 77, 1848 (1921).

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Potassium Iodid Test of Kidney Function.—The author gave 0.5 gm. potassium iodid by the mouth to 124 healthy persons after drinking 400 or 500 c.c. of water, and he determined the interval before it appeared in the urine. He drew the urine through a catheter every two or three minutes. In 100 healthy men between 18 and 48, 0.1 gm. was injected intravenously. The iodin reaction was generally positive in the urine in three or four minutes, never later than eight, and the whole amount was eliminated between the fourteenth and twenty-second hours. In 24 cases the test was made quantitative. The findings related form a basis for application of this test in pathologic conditions.—A. Narath, *Mitteil. Grenzgeb. Med. u. Chir.*, 34, 90 (1921); *Jour. A. M. A.*, 77, 1854 (1921).

The Hemoclasic Crisis as Test of Liver Functioning.—The author applied Widal's test ingestion of 200 gm. of milk to eighty-two persons, and thus confirmed the specific connection between the positive reaction and the liver. When leukopenia or leukocytosis is observed twenty minutes after sipping the milk, this tells the story, the leukopenia or hemoclasic crisis, as he calls it, testifying to the inability of the liver to retain and modify the proteins brought to it by the portal vein. The leukocytes may drop by 20 to 60 per cent, but this leukopenia does not parallel the severity of the liver changes. For diabetes, the test is made with 20 gm. glucose.—E. Somjen, *Med. Klin.* (Berlin), 17, 1203 (1921); *Jour. A. M. A.*, 77, 2008 (1921).

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Hemolysins in Spinal Fluid in Meningitis.—The author has found the presence of hemolysins in the lumbar puncture fluid a reliable index not only of the presence of purulent and cerebrospinal meningitis but of the trend toward recovery or aggravation. Before the clinical manifestations showed any improvement, the reduction in the proportion of hemolysins enabled a more favorable prognosis, and this was confirmed by the course. On the other hand, the negative findings with serous meningitis and with convulsions from spasmophilia were always dependable, as also in hydrocephalus, chorea, epilepsy and spastic diplegia. He urges greater use of this Weil-Kafka method by pediastrists; all that is necessary is to add 0.5 c.c. of the sheep blood solution to 5 c.c. of the cerebrospinal fluid. The hemolysins normally in human blood do not get into the spinal fluid in normal conditions. —*F. Schleissner, Med. Klin.* (Berlin), 17, 1206 (1921); *Jour. A. M. A.*, 77, 2008 (1921).

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Spirochetal Pulmonary Gangrene.—In three cases, the presence in large numbers of fusiform bacilli and spirochetes in early gangrenous ulceration of the lung suggest their etiologic relationship thereto. These spirochetes morphologically resemble Spirochaeta

(or Treponema) buccalis, vincenti, microdentium, mucosum and macrodentium. In all three cases, marked dental caries and pyorrhea alveolaris were present. Smears from these lesions showed organisms morphologically indistinguishable from those mentioned above. The organisms, which are poorly colored by the usual laboratory stains, are readily demonstrated by the Fontana method in smears and by the Levaditi method in tissues. From a study of the pulmonary lesions in these three cases, the impression is gained that they are extensive pneumonias, caused by organisms from the unclean mouth, in which gangrenous ulceration occurs because of activity of the aspirated fusiform bacilli and spirochetes.—B. S. Kline, *Jour. A. M. A.*, 77, 1874 (1921).

✚

Preparing Colloidal Gold.—The author has simplified the technic for the colloidal gold used in the Lange test, and states that he was constantly successful with this new method in obtaining a good suspension. He adds to 100 c.c. of distilled water 1 c.c. of a 1 per cent solution of gold chlorid and 1 c.c. of 2 per cent solution of potassium carbonate. This is heated over a flame and, as it begins to boil, he adds 1 c. c. of a 0.5 per cent solution of glucose and continued the boiling. The fluid in about a minute turns violet and in a few seconds the tint becomes a brilliant purple, and it is then removed from the flame.—N. Pietravalle, *Annali d'Igiene*, 31, 309 (1921); *Jour. A. M. A.*, 77, 1927 (1921).

✚

A New Test for Tuberculosis.—The author describes a new test for tuberculosis which he has tried in about eighty cases of tuberculosis and in fifty normal control subjects. About 20 to 60 drops of blood are drawn from the thumb by a Francke syringe, and after twenty-four hours the serum separated. The serum is heated in a bath at 60° C. for three-quarters of an hour and intradermal reaction practised with two drops. If the reaction is positive, a red infiltrated papule from 10 to 15 mm. in diameter forms at the site of injection in twenty-four to forty-eight hours. If it is negative, no change is noted, or at most a temporary redness. The results were very satisfactory and always negative in the control cases even when syphilis was present.—R. Leone, *Rif. Med.*, Aug. 20, 1921; *Brit. Med. Jour.*, Nov. 5, 1921.

Diagnostic Value of Sugar Content of Cerebrospinal Fluid.—A study of the literature on this subject brings out two points: First, a "high" sugar content should not be regarded as a positive diagnostic sign of lethargic encephalitis; second, a low sugar content (provided the fluid is fresh) is very strong indication of an acute or tuberculous meningitis. Coope's findings in ninety-five cases confirm these conclusions. It has not been possible simultaneously to examine the sugar content of the blood. The method was that described by Folin and Wu for blood sugar.—R. Coope, *Quart. Jour. Med.* (Oxford) 15, 1 (1921); *Jour. A. M. A.*, 77, 1769 (1921).

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Trench Fever.—The organism of trench fever is present in the "whole blood." The evidence seems to be in favor of the organism being an extracorpuscular rather than an intracorpuscular parasite. The smallest quantity of whole blood which has given rise to the disease was 0.5 c. c. The blood is infective from the first day of the disease, and in one case was found to be still infective after 443 days. The microscopical examination of the blood has not up to the present revealed the organism, or at least has not differentiated it from other granules present in blood. There is some evidence that the organism may leave the body in the sputum and urine, but the chief and only way which has any practical significance is by means of a blood-sucking insect, the louse. There is no evidence that infection takes place through food, drink or air, but only by inoculation of the organism by means of this insect. The chief method of infection is not, as might be expected, by the bite of the louse, but by the infected excreta of the louse being brought in contact with an abraded surface of the skin. After a louse has fed on a case of trench fever, five to nine days elapse before the excreta become infective. If lice are fed on a case for some time, a high percentage of the lice become infective. There is no transmission of the organism of trench fever from infected lice through the egg to their offspring. The tenth of a milligram of excreta has been found sufficient to set up the disease. The organism of trench fever retains its virulence in louse excreta for at least four months. The virulence of lice excreta is lost by exposure to dry heat of 100° C. for 20 minutes; to moist heat of 60° C. for a similar time. It is doubt-

ful if any of the laboratory animals are susceptible to trench fever.—D. Bruce, *Jour. Hyg.* (British) 20, 258 (1921).

✣

A Study of the Gonococcus and Gonococcal Infections.—Gonococcus stock cultures were found to grow satisfactorily for all routine work on testicular agar. Chocolate blood testicular agar was found to be a useful medium for increasing the vitality of a weakly growing culture. Environmental requirements of the organism included moisture of the atmosphere but not a reduced oxygen tension. Isolation of cultures from acute cases of anterior urethritis in men was most successfully accomplished on chocolate blood testicular agar. No pure cultures of gonococci were isolated from chronic cases of gonorrheal endocervicitis, although single colonies of organism morphologically typical gonococci were obtained on plates of hydrocele testicular agar containing certain members of the triphenylmethane series of dyes as an inhibitor of contaminating organisms. The alexin fixation test serves as an aid in diagnosis, but it should be still considered rather as confirmatory evidence than as an independent basis of diagnosis. It is of little value in early cases, as might be expected. A non-specific reaction was obtained by the intracutaneous injection of a preparation of gonococci. A like reaction was obtained in gonorrheal patients on the injection of a preparation of meningococci. No typing of strains of gonococcus was obtained by means of the alexin fixation and agglutination reactions or by means of the method of absorption of agglutinins.—M. W. Cook and D. D. Stafford, *Jour. Inf. Dis.*, 29, 576 (1921).

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Studies on Complement Fixation.—The velocity of fixation of complement employing syphilitic serums and 6 different Wassermann antigens was studied. The periods of fixation were 0.5, 15 and 30 minutes and 1, 2, 3, 4, 5, 6 and frequently 7 hours. The temperatures of fixation were water bath, room and icebox, and, in some cases, water bath and icebox. It was observed that the velocity of fixation of complement is not markedly affected by temperatures ranging between water bath and icebox. The tendency for slightly stronger fixation at icebox temperature compared with that of the water bath was noted with all antigens, except the Noguchi. The latter antigen showed a tendency for somewhat stronger fixation at water bath temperature. It was also observed that a fixation period of 4 hours at icebox temperature approaches the maximum amount of fixation of complement with all antigens, including the Noguchi, although the latter in a few cases showed slightly more fixation after 1 hour in the water bath than after 4 hours in the icebox. Finally, it was shown that the velocity of fixation of complement is directly proportional to the concentration of antibodies in the syphilitic serums.

It was shown that thermal destruction of syphilitic complement-fixing substances is markedly influenced by the mode of fixation. When fixation was carried out for 1 hour at water bath temperature, the heating of serum for 30 minutes at 56° C. showed in a total of 87 serums tested an average antibody destruction of 32 per cent. When fixation was carried out for 4 hours at icebox temperature, some serums showed a slight loss, others, no loss and still others, a considerable gain in antibody content, with the result that the average finding of the 87 serums tested represented a gain of 10 per cent. Heating syphilitic serums for 20 minutes at 62° C. gave an average of 75 per cent antibody destruction, with water bath fixation, and 46 per cent with icebox fixation. The type of antigen employed was also found to influence thermal destruction of these antibodies. Heating serums for 30 minutes at 56° C. showed either little antibody destruction or an apparent gain in antibody content with 2 alcoholic extract antigens and one cholesterinized antigen and icebox fixation, while even with this mode of fixation considerable destruction was noted at this temperature and period when employing the Noguchi antigen. Finally, it was shown that complement-fixing antibodies obtained on protein or bacterial injections were comparatively thermostable. These antibodies were found to be capable of withstanding a temperature of 65° C. Temperature of 70° C. and 75° C. showed varying degrees of antibody destruction—somewhat more so in the case of bacterial immune bodies than those obtained on protein injections. With regard to the effect of the mode of fixation on specific antibody destruction due to heating, no marked difference was observed between water bath and icebox temperatures.—R. L. Kahn, R. M. Olin, Jr., S. R. Johnson and A. G. Boyd, *Jour. Inf. Dis.*, 29, 630 (1921).

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